



Workshop Manual

Fox 2004 ➤

Fox 2010 ➤

Fox 2014 ➤

SpaceFox 2011 ➤

Brake systems

Edition 02.2019

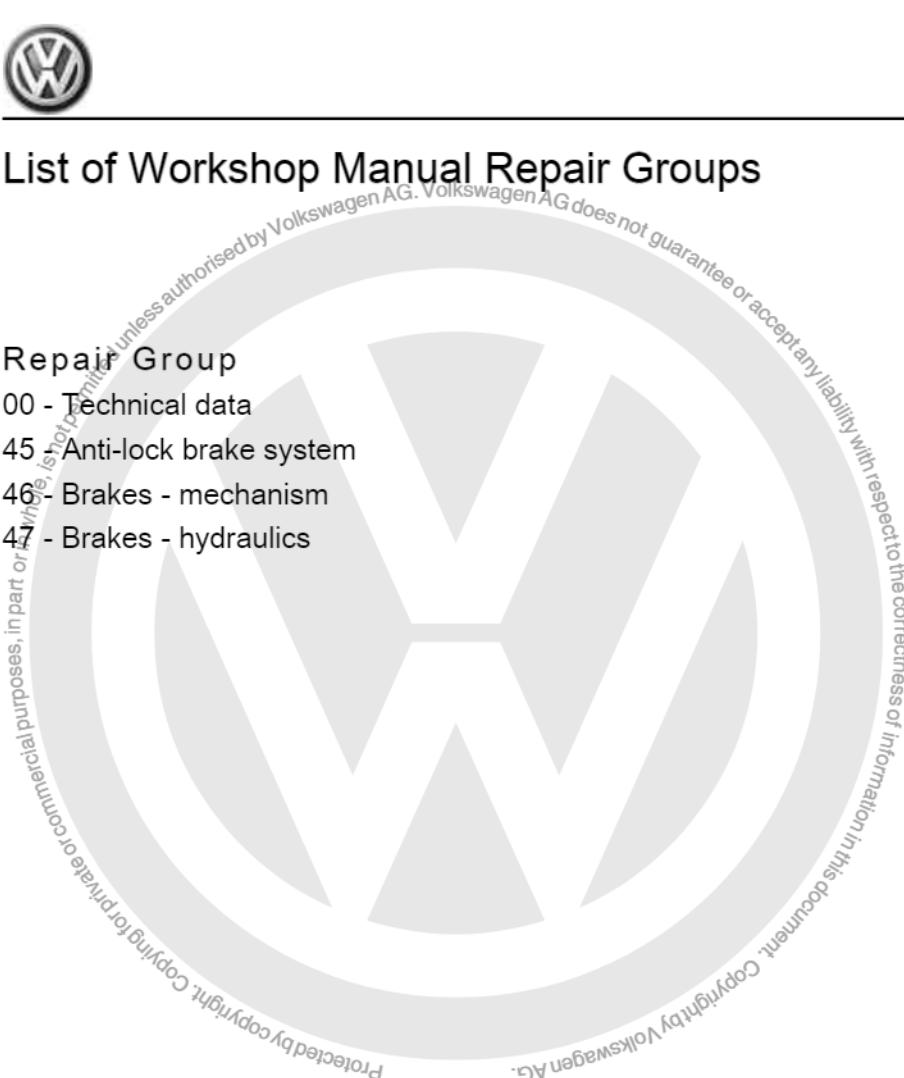




List of Workshop Manual Repair Groups

Repair Group

- 00 - Technical data
- 45 - Anti-lock brake system
- 46 - Brakes - mechanism
- 47 - Brakes - hydraulics



Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.

All rights reserved.
No reproduction without prior agreement from publisher.



Contents

00 - Technical data	1
1 Technical Data	1
1.1 Brake PR number correspondence	1
1.2 Brake technical data	2
45 - Anti-lock brake system	4
1 General information on the Bosch 5.7 anti-lock braking system (ABS)	4
1.1 ABS Bosch 5.7	4
2 General information for the anti-lock braking system (ABS) Bosch 8.0	5
3 General information on the Bosch 8.2 anti-lock braking system (ABS)	7
4 General information on the Bosch 9.0 anti-lock braking system (ABS)	8
5 Information on repair works on the ABS	9
6 Connect Vehicle diagnostic, testing and information system VAS 5051A /52 and select functions	10
7 Electrical/electronic components and installing locations	11
7.1 ABS Bosch 5.7	11
7.2 ABS Bosch 8.0 (ABS/ESP)	13
7.3 ABS Bosch 8.2	15
7.4 ABS Bosch 9.0	16
8 Hydraulic unit, brake servo/brake master cylinder - assembly overview (Bosch 5.7)	18
8.1 Hydraulic unit connections	20
8.2 Command unit for hydraulic unit - remove and install	20
8.3 Brake pressure sensor 1 G201 - remove and install	25
9 Hydraulic unit, brake servo/brake master cylinder - assembly overview (Bosch 8.0 / 8.2)	26
9.1 Hydraulic unit connections	28
9.2 ABS control unit J104 on ABS hydraulic unit N55 - remove and install	28
10 Fault indication via control lights	35
10.1 Control lights	35
11 ABS system components on the front and rear axles - remove and install	37
11.1 ABS system components on the front axle - remove and install	37
11.2 Front axle speed sensor - remove and install	37
11.3 Bosch 5.7 front speed sensor cables - remove and install	38
11.4 Bosch 8.0 / 8.2 front speed sensor cables - remove and install	41
11.5 ABS system components on rear axle (vehicles with drum brakes) - remove and install	42
11.6 Speed sensor on rear axle (drum brake) - remove and install	43
11.7 Rear speed sensor cables - remove and install	44
12 ESP system components - remove and install	46
12.1 Lateral tilting intensity sensor G202 and Lateral acceleration sensor G200 - remove and install	46
12.2 Steering angle sensor G85 - remove and install	47
46 - Brakes - mechanism	48
1 Front wheel brake - repair	48
1.1 Front brake - Brake caliper FS II - assembly overview	48
1.2 Brake pads - remove and install	50
1.3 FS II brake caliper - remove and install	52
1.4 Front wheel brake - FS II brake caliper - repair	55
1.5 Brake pads, FS III disc brake cylinder - remove and install	56
1.6 FS III brake caliper - remove and install	58
1.7 Brake disc - remove and install	60
1.8 Brake disc - check (disc knocking)	61



1.9	Brake disc with visual check - check	62
2	Rear wheel brake (drum brake) - repair	65
2.1	Rear wheel brake - assembly overview	65
2.2	Brake drum - repair	67
2.3	Brake drum - remove and install	69
2.4	Brake shoes - remove and install	70
2.5	Rear wheel brake cylinder - remove and install	73
3	Handbrake - assembly overview	74
3.1	Handbrake cable - adjust	74
3.2	Handbrake cable (drum brake) - remove and install	76
3.3	Handbrake lever handle - remove and install	81
3.4	Handbrake lever - remove and install	82
3.5	Handbrake switch - remove and install	84
4	Brake pedal - assembly overview	85
4.1	Brake pedal - separate	86
4.2	Pedal set - remove and install	87
4.3	Brake pedal - remove and install	88
4.4	Brake pedal switch F47 - remove and install	89
47 - Brakes - hydraulics	90
1	Assembly overview: Brake servo/brake master cylinder	90
1.1	Master cylinder - remove and install	92
1.2	Inspect the non-return valve	93
1.3	Brake servo - remove and install	93
1.4	Vacuum pump for 4-cylinder diesel engines and with distribution injector pump (diesel vehicles) - remove and install	97
2	Vacuum system - Check	99
2.1	Test instructions	99
2.2	Servo brake vacuum measurement device VAS 6721 - connect	100
2.3	Vacuum generation control	101
2.4	Leak control	101
2.5	Vacuum generation with the manual vacuum pump VAS 6213	103
3	Front brake caliper, FS II brake caliper - repair	104
3.1	Plunger for front brake caliper - remove and install	105
4	Front brake caliper, FS II brake caliper - repair	107
4.1	Front brake caliper plunger - remove and install	107
5	Vehicles without braking power adjustment - assembly overview	110
6	Braking power adjustment - assembly overview	111
6.1	Braking power adjustment - adjust	112
6.2	Braking power adjustment - check	112
7	Bleed the brake system	114
7.1	Bleed the brake system with the filling and bleeding equipment	114
7.2	Brake system, only vehicles with ABS/EDS/ASR - bleed when the reservoir is empty	116



00 – Technical data

1 Technical Data

(VRL012724; Edition 02.2019)

1.1 Brake PR number correspondence

The type of brake installed in the vehicle is listed on the vehicle ID tag with the corresponding PR number.

Example of a vehicle identification tag

In this example, the following brake is installed in the vehicle:

- ◆ -Arrow 1- Rear wheel brake (-1KB- Drum Brake)
- ◆ -Arrow 2- Front wheel brake (-1LG- FS III Disc brake)

The vehicle ID label is located in the spare wheel arch and in the Maintenance and Warranty book.

The following table displays the PR number coding. This is important for the combination caliper/disc/drum and brake pads/linings.

- ◆ Correspondence ⇒ Electronic Part Catalogue .

9BWKB05Z054010902
5Z1 2E4 3043428
BJA GXS
LA7W NOV/EA
X9G B1D COD GOC HOA JIL MYO Q1A L17 1AL /// 1MA EOA 5RQ 5SG TCO 3SO 4VA 1KB OG4 COD 8GM 8RA G16 1LG /// ///
1 2
R00-0110

1.1.1 Font wheel brake (disc brake)

PR number	Front wheel brake
1LM / 1LA / 1ZN	FS II (13")
1LG / 1ZF / 1ZR	FS III (14")

1.1.2 Rear wheel brake (drum brake)

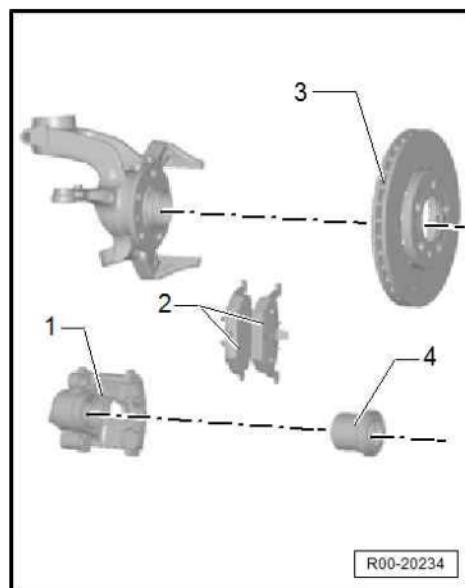
PR number	Rear wheel brake
1KB	TB 200 X 40 CR 17 mm



1.2 Brake technical data

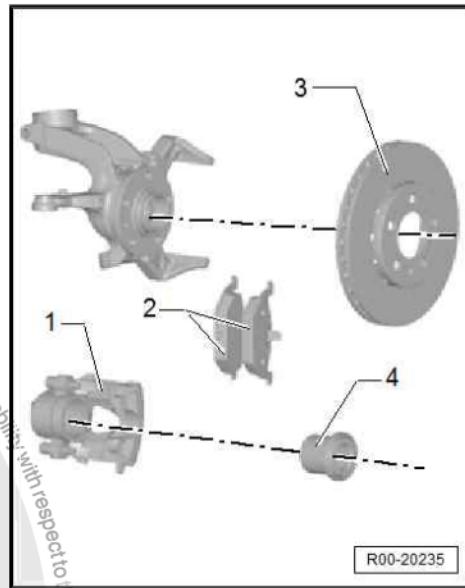
1.2.1 Front wheel brake FS II

	PR number		1LM / 1ZN / 1LA
			(without power steering)
	Brake master cylinder	Ø mm	19.05 without ABS
	Brake servo	Ø in	8.544"
-1-	Brake caliper		FS II (13")
-2-	Brake pad, thickness	mm	12
-3-	Brake disc	Ø mm	239
	Brake disc, thickness	mm	18
-4-	Brake caliper, plunger	Ø mm	48



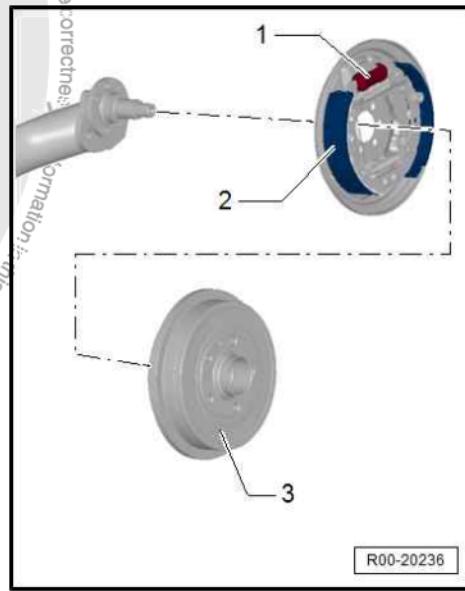
1.2.2 Front wheel brake FS III

	PR number		1LG / 1ZF / 1ZR
			(with power steering)
	Brake master cylinder	Ø mm	20.64
	Brake servo	Ø in	8.544"
-1-	Brake caliper		FS III (14")
-2-	Brake pad, thickness	mm	14.17
-3-	Brake disc	Ø mm	256
	Brake disc, thickness	mm	22
-4-	Brake caliper, plunger	Ø mm	54



1.2.3 Rear wheel brake (drum brake, without ABS)

	PR number		1KB
	Brake master cylinder	Ø mm	20.64 19.05 ¹⁾
	Brake servo	Ø in	8.5"
-1-	Wheel brake cylinder	Ø mm	17.46 19.05
-2-	Brake shoe, thickness	mm	5
	Brake shoe, width	mm	38.8
-3-	Brake drum	Ø mm	200

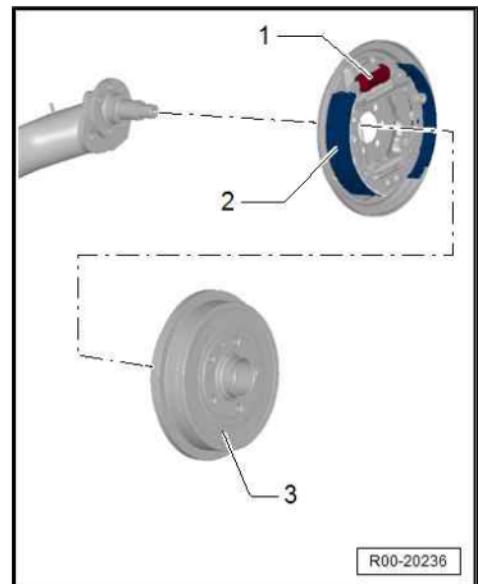


1) Only for vehicles with 13" running gear without ABS



1.2.4 Rear wheel brake (drum brake, with ABS)

	PR number		1KB
	Brake master cylinder	Ø mm	20.64
	Brake servo	Ø in	8.544"
-1-	Wheel brake cylinder	Ø mm	17.46 19.05
-2-	Brake pad, thickness	mm	5
	Brake pad, width	mm	38.8
-3-	Brake drum	Ø mm	200



Protected by Copyright © Volkswagen AG. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by Volkswagen AG. Volkswagen AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copying by Volkswagen AG.



45 – Anti-lock brake system

1 General information on the Bosch 5.7 anti-lock braking system (ABS)

1.1 ABS Bosch 5.7

The ABS brake system is arranged diagonally. The braking power amplification is carried out pneumatically through the vacuum brake servo.

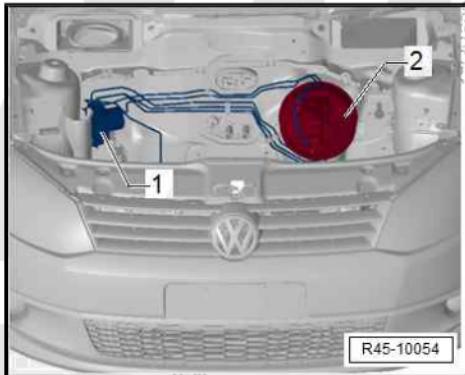
Failures in the ABS influence the brake system and amplification. A different braking behaviour should be expected. After the ABS control light comes on, the rear wheels may lock early.

In case of complaint, ABS hydraulic unit - N55- and ABS control unit - J104- must be replaced together.

Remove and install ABS hydraulic unit - N55- and ABS control unit - J104- .

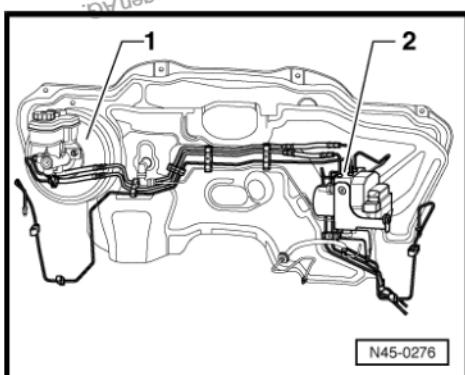
Location of ABS in a vehicle with left-hand drive:

- 1 - ABS hydraulic unit - N55- and ABS control unit - J104-
- 2 - Brake servo.



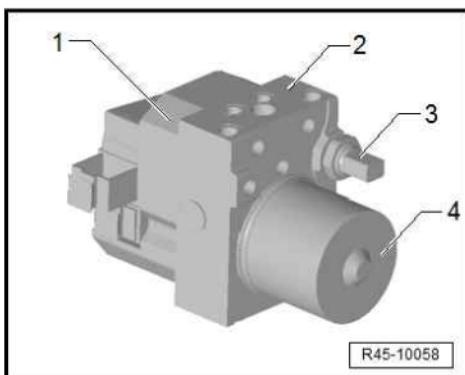
Location of the ABS in a vehicle with the steering wheel on the right side:

- 1 - Brake servo.
- 2 - ABS hydraulic unit - N55- and ABS control unit - J104-



Bosch 5.7 (ABS) :

Command device -1- and hydraulic system unit -2- constitute a unit. In case of damage, replace both the command device and hydraulic system unit. Do not separate hydraulic pump -3- from the hydraulic system unit.





2 General information for the anti-lock braking system (ABS) Bosch 8.0

The ABS Bosch 8.0 in this vehicle has the following configuration:

- ◆ ABS.
- ◆ ABS/EDS/ASR/ESP.

The ABS brake system is arranged diagonally. The braking power amplification is carried out pneumatically through the vacuum brake servo.

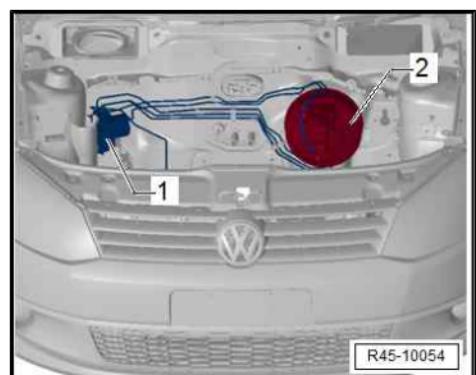


Note

Failures on the ABS do not influence the brake system and the brake servo. The conventional braking system remains functional even without the ABS. A difference in the behaviour of the brake system is to be expected. After the ABS control light comes on, the rear wheels may lock early.

Location of the ABS in vehicles with steering wheel on the left side:

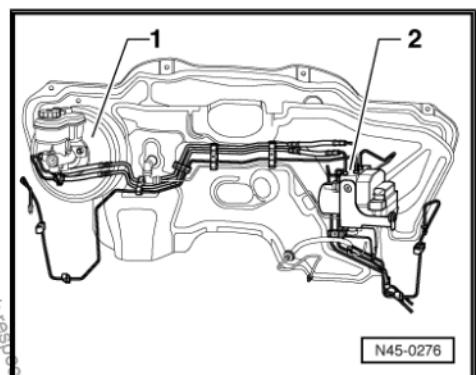
- 1 - ABS hydraulic unit - N55- and ABS control unit - J104-
- 2 - Brake servo.



Location of the ABS in vehicles with steering wheel on the right side:

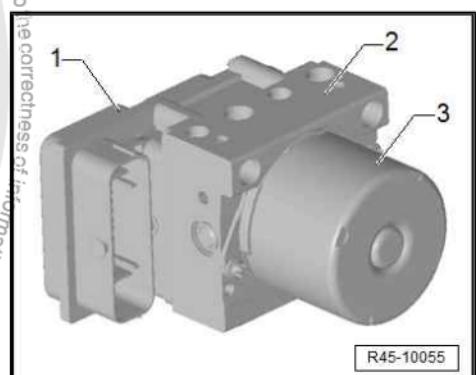
- 1 - Brake servo.
- 2 - ABS hydraulic unit - N55- and ABS control unit - J104-

ABS control unit - J104- 1- and ABS Hydraulic Unit - N55- 2- form one unit. In case of damage ABS hydraulic unit - N55- and ABS control unit - J104- must both be replaced. Do not separate ABS reflux pump - V39- 3- from ABS hydraulic unit - N55- .



Bosch 8.0 (ABS) and (ABS/ASR):

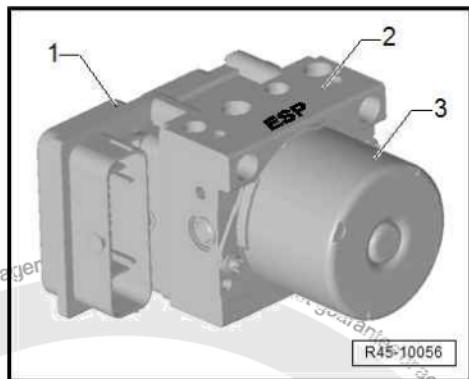
ABS hydraulic unit - N55- and ABS control unit - J104-
⇒ page 13.





Bosch 8.0 (ABS/EDS/ASR/ESP):

ABS hydraulic unit - N55- and ABS control unit - J104-
⇒ [page 13](#).





3 General information on the Bosch 8.2 anti-lock braking system (ABS)

The ABS brake system (Bosch 8.2) is arranged diagonally. The braking power amplification is carried out pneumatically through the vacuum brake servo.



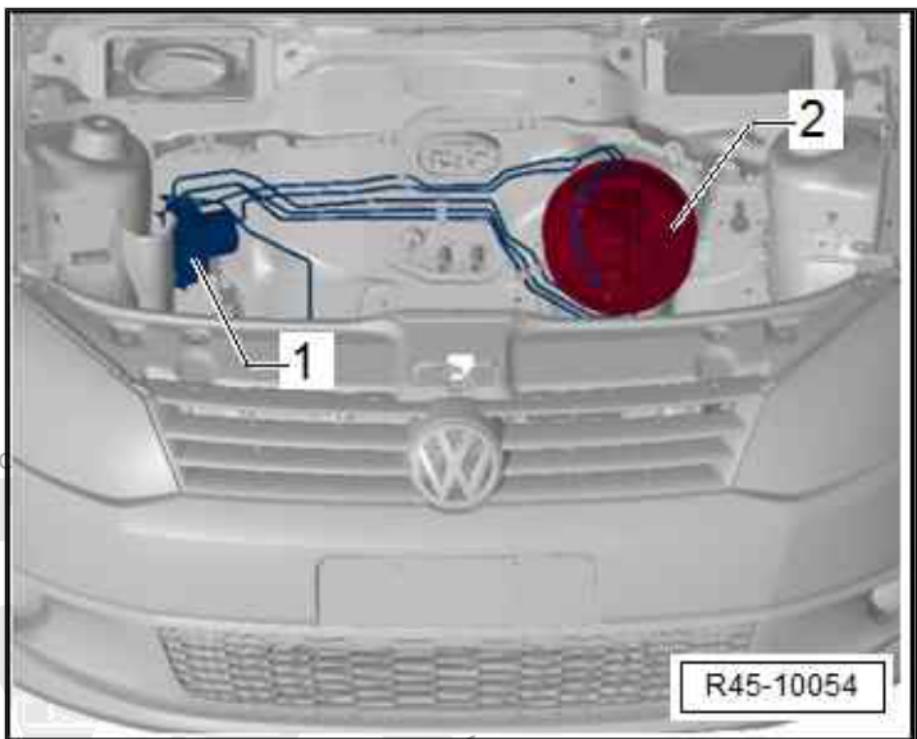
Note

Failures in the ABS do not influence the brake system and the brake servo. The conventional braking system remains functional even without the ABS. A difference in the behaviour of the brake system is to be expected. After the ABS control light lights up, the rear wheels may lock early!

ABS location:

1 - Hydraulic system unit and ABS command device

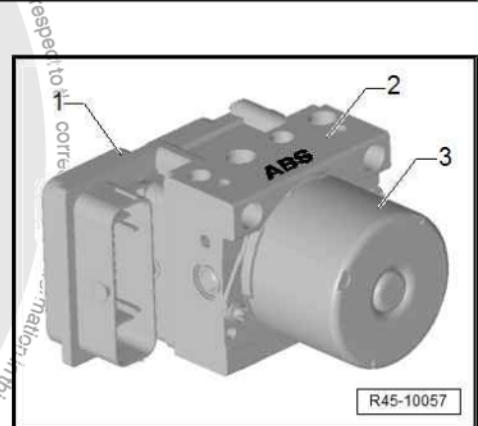
2 - Brake servo



Bosch 8.2 (ABS) :

Command device -1- and hydraulic system unit -2- constitute a unit. In case of damage, replace both the command device and hydraulic system unit. Do not separate hydraulic pump -3- from the hydraulic system unit.

ABS hydraulic unit - N55- and ABS control unit - J104-
[→ page 15](#).





4 General information on the Bosch 9.0 anti-lock braking system (ABS)

The ABS brake system (Bosch 9.0) is arranged diagonally. The braking power amplification is carried out pneumatically through the vacuum brake servo.

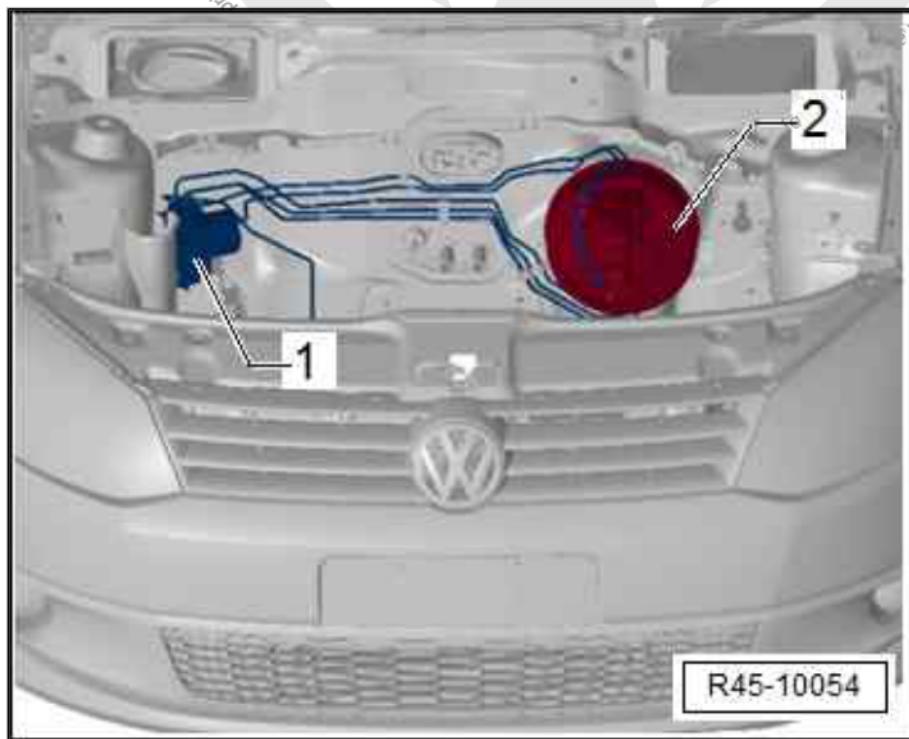


Failures in the ABS do not influence the brake system and the brake servo. The conventional braking system remains functional even without the ABS. A difference in the behaviour of the brake system is to be expected. After the ABS control light lights up, the rear wheels may lock early!

ABS location:

1 - Hydraulic system unit and ABS command device

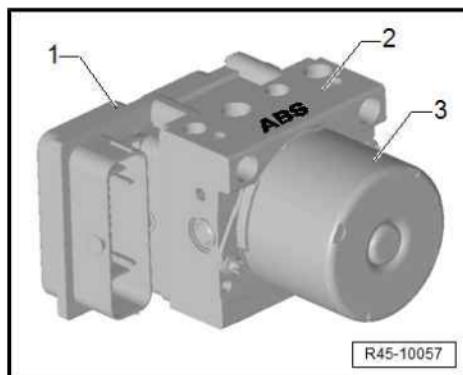
2 - Brake servo



Bosch 9.0 (ABS) :

Command device -1- and hydraulic system unit -2- constitute a unit. In case of damage, replace both the command device and hydraulic system unit. Do not separate hydraulic pump -3- from the hydraulic system unit.

ABS hydraulic unit - N55- and ABS control unit - J104-
[⇒ page 15](#) .





5 Information on repair works on the ABS

Before repairing the antilock system, determine cause of damage by using the "Assisted troubleshooting" in Vehicle diagnostic, testing and information system - VAS 5051A /52- .

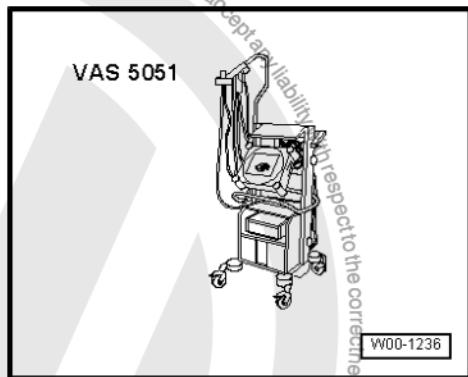
- ◆ Check whether the vehicle has a coded radio. If so, request the anti-theft code before disconnecting the battery earth strap.
- ◆ When the battery is reconnected, check the vehicle's equipment (radio, clock, electric door locks, power windows, etc.) according to the repair manual and/or instructions of use.
- ◆ Before starting to repair the antilock braking system, determine the cause of damage with the help of the "Assisted troubleshooting".
- ◆ Before working with an electric welding equipment, disconnect the battery earth strap, with the ignition off.
- ◆ Observe the effective measures and notes when handling the brake fluid, [⇒ page 114](#)
- ◆ After services requiring opening of the brake system, bleed the brake system with the Brake filling and bleeding equipment - VAS 5234- or the Brake pedal pressing device - VAG 1869- , [⇒ page 114](#)
- ◆ During the test drive, ensure at least one brake adjustment is performed (a slight pulsing on the brake pedal should be felt).
- ◆ While working on the ABS system, a high level of cleanliness must be maintained, and under no circumstances can materials containing mineral oil, such as, for example, oils, grease, etc., be used.
- ◆ Carefully clean the union points and surrounding surfaces before releasing them; however, no cleaning products should be used, such as, for example, brake cleaning products, petrol, solvents, or similar products.
- ◆ The components removed must be placed on a clean surface and covered over.
- ◆ If the repairs are not carried out immediately, carefully cover the open components or place them in the proper location. (Use the lid from repair set 1H0 698 311 A)
- ◆ Use cloths that do not fray.
- ◆ Only remove the replacement parts from their packages immediately before assembly.
- ◆ Use only parts in original packaging.
- ◆ Do not work with compressed air nor move the vehicle with the system open.
- ◆ Make sure that no brake fluid comes into contact with the connectors.
- ◆ During painting, the command unit may be momentarily submitted to a maximum temperature of 95 °C, and for longer periods (approximately 2 hours) at an ambient temperature of 85 °C.



6 Connect Vehicle diagnostic, testing and information system - VAS 5051A /52- and select functions

Special tools and workshop equipment required

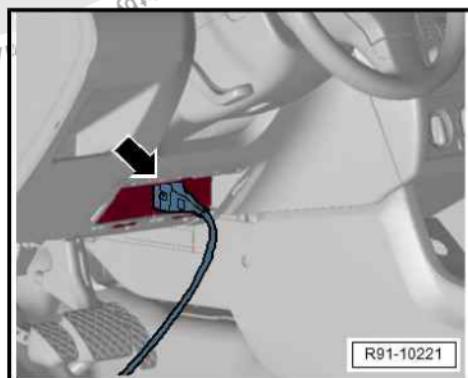
- ◆ Vehicle diagnostic, testing and information system - VAS 5051A /52-
- ◆ Diagnosis cable - VAS 5051/1 or Diagnosis cable - VAS 5051/3-



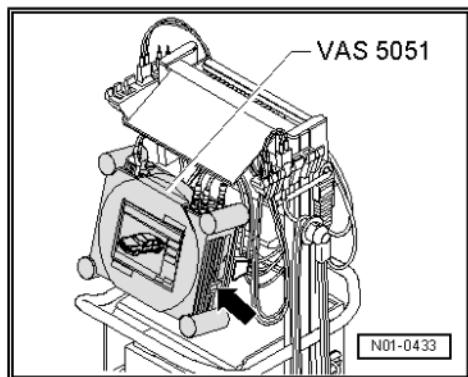
WARNING

- ◆ During a test drive, the measuring and checking equipment must always be fastened to the rear seat of the vehicle.
- ◆ During a test drive, only one person should operate this equipment.

- Connect the diagnostic cable connector Diagnostic cable - VAS 5051/1- or Diagnostic cable - VAS 5051/3- to the diagnostic connection -arrow-.



- Turn on Vehicle diagnostic, testing and information system - VAS 5051A/52- and follow the on-screen instructions.





7 Electrical/electronic components and installing locations

7.1 ABS Bosch 5.7

1 - ABS hydraulic unit - N55-

The hydraulic unit comprises the following components:

- ABS return pump - V39-
- may be checked by the "Assisted Troubleshooting" with Vehicle diagnostic, testing and information system - VAS 5051A /52-
- Valve block (includes intake and exhaust valves)
- ABS reflux pump - V39 and the valve block must not be separated
- remove and install [⇒ page 20](#)

2 - ABS control unit - J104-

- may be checked by the "Assisted Troubleshooting" with Vehicle diagnostic, testing and information system - VAS 5051A /52-
- do not disconnect the command unit connector before the self-diagnosis
- remove and install [⇒ page 20](#)

3 - Brake pressure sensor 1 - G201-

- may be checked by the "Assisted Troubleshooting" with Vehicle diagnostic, testing and information system - VAS 5051A /52-
- remove and install [⇒ page 25](#)

4 - Brake light switch - F- or Brake pedal switch - F47-

- may be checked by the "Assisted Troubleshooting" with Vehicle diagnostic, testing and information system - VAS 5051A /52-
- remove and install [⇒ page 89](#).

5 - ABS control lamp - K47-

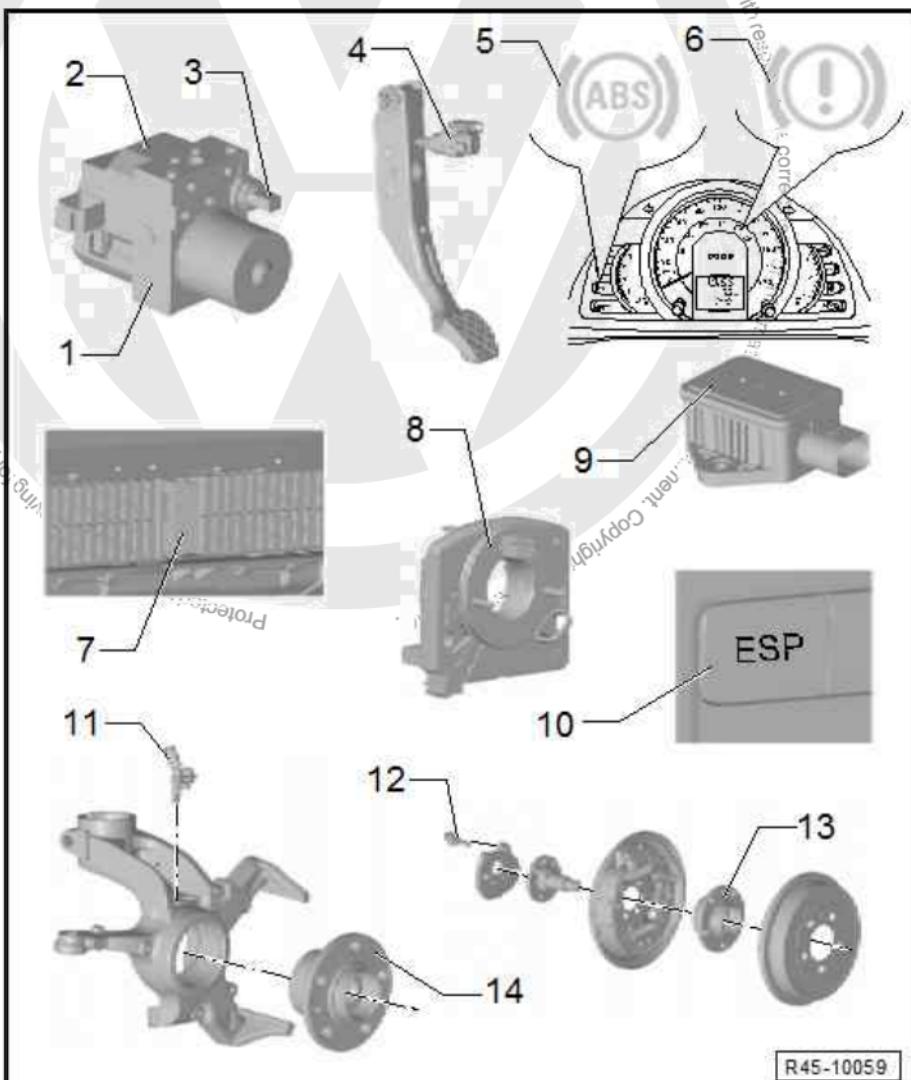
- Installation location: dash panel.

Function: [⇒ page 35](#).

6 - Brake system control lamp - K118-

- Installation location: dash panel

Function: [⇒ page 35](#)



R45-10059



7 - Diagnostic connector

- Installation location: Next to the fuse box, under the steering column.

8 - Steering angle sensor - G85-

- may be checked by the "Assisted Troubleshooting" with Vehicle diagnostic, testing and information system - VAS 5051A /52-
- Installation location: on the steering column, between the steering wheel and the steering column switch.
- Observe the assembly procedure

[⇒ page 47](#).

9 - Lateral acceleration sensor - G200- and Lateral tilting intensity sensor - G202-

- Not available in the ABS Bosch 5.7.

10 - ESP button

- Not available in the ABS Bosch 5.7.

11 - Right front wheel rotation sensor - G45- / Left front wheel rotation sensor - G47-

- may be checked by the "Assisted Troubleshooting" with Vehicle diagnostic, testing and information system - VAS 5051A /52-
- remove and install [⇒ page 37](#).

12 - Right rear wheel rotation sensor - G44- / Left rear wheel rotation sensor - G46-

- may be checked by the "Assisted Troubleshooting" with Vehicle diagnostic, testing and information system - VAS 5051A /52-
- remove and install [⇒ page 43](#).

13 - Wheel hub/roller bearing assembly

- the ABS sensor ring is assembled in the wheel roller bearing.

14 - Wheel hub/roller bearing assembly

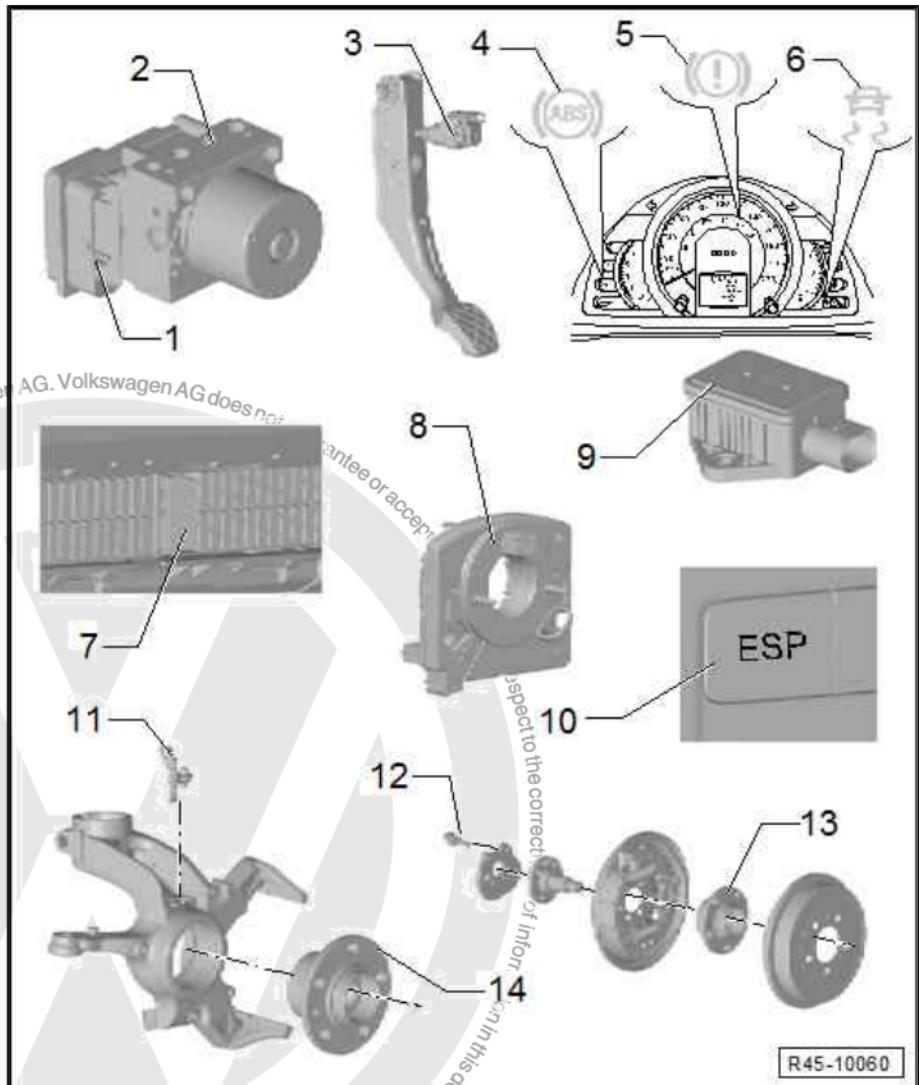
- the ABS sensor ring is assembled in the wheel roller bearing.



7.2 ABS Bosch 8.0 (ABS/ESP)

1 - ABS control unit - J104-

- may be checked by the "Assisted Troubleshooting" with Vehicle diagnostic, testing and information system - VAS 5051A /52-
- do not disconnect the command unit connector before the self-diagnosis
- remove and install
⇒ [page 28](#)



2 - ABS hydraulic unit - N55-

The hydraulic unit comprises the following components:

- ABS return pump - V39-
- may be checked on the "Assisted Troubleshooting" function in the Vehicle diagnostic, testing and information system - VAS 5051A /52-
- valve block (includes intake and exhaust valves)
- ABS reflux pump - V39- and the valves may not be separated.
- remove and install
⇒ [page 28](#) .

3 - Brake light switch - F- or Brake pedal switch - F47-

- remove and install
⇒ [page 89](#) .

4 - ABS control lamp - K47-

- Installation location: dash panel.

Function: ⇒ [page 35](#) .

5 - Brake system control lamp - K118-

- Installation location: dash panel.

Function: ⇒ [page 35](#) .

6 - ASR and ESP control light - K155-

- Installation location: dash panel.

Function: ⇒ [page 35](#) .

7 - Diagnosis connector

- Installation location: Next to the fuse box, under the steering column.

8 - Steering angle sensor - G85-

- may be checked by the "Assisted Troubleshooting" with Vehicle diagnostic, testing and information system - VAS 5051A /52-
- Installation location: on the steering column, between the steering wheel and the steering column switch.
- Observe the assembly procedure.



⇒ [page 47](#) .

9 - Lateral acceleration sensor - G200- and Lateral tilting intensity sensor - G202-

- may be checked by the "Assisted Troubleshooting" with Vehicle diagnostic, testing and information system - VAS 5051A /52-
- packed in a case.
- Installation location: on the left seat cross member, on the floor plate.
- Follow assembly procedures
- remove and install ⇒ [page 46](#) .

10 - Switch for the ASR/ESP electronic stability program - E256-

- Installation location: dash panel.

11 - Right front wheel rotation sensor - G45- Left front wheel rotation sensor - G47-

- may be checked by the "Assisted Troubleshooting" with Vehicle diagnostic, testing and information system - VAS 5051A /52-
- remove and install ⇒ [page 37](#) .

12 - Right rear wheel rotation sensor - G44- / Left rear wheel rotation sensor - G46-

- may be checked by the "Assisted Troubleshooting" with Vehicle diagnostic, testing and information system - VAS 5051A /52-
- remove and install ⇒ [page 43](#) .

13 - Wheel hub/roller bearing assembly

- the ABS sensor ring is assembled in the wheel roller bearing.

14 - Wheel hub/roller bearing assembly

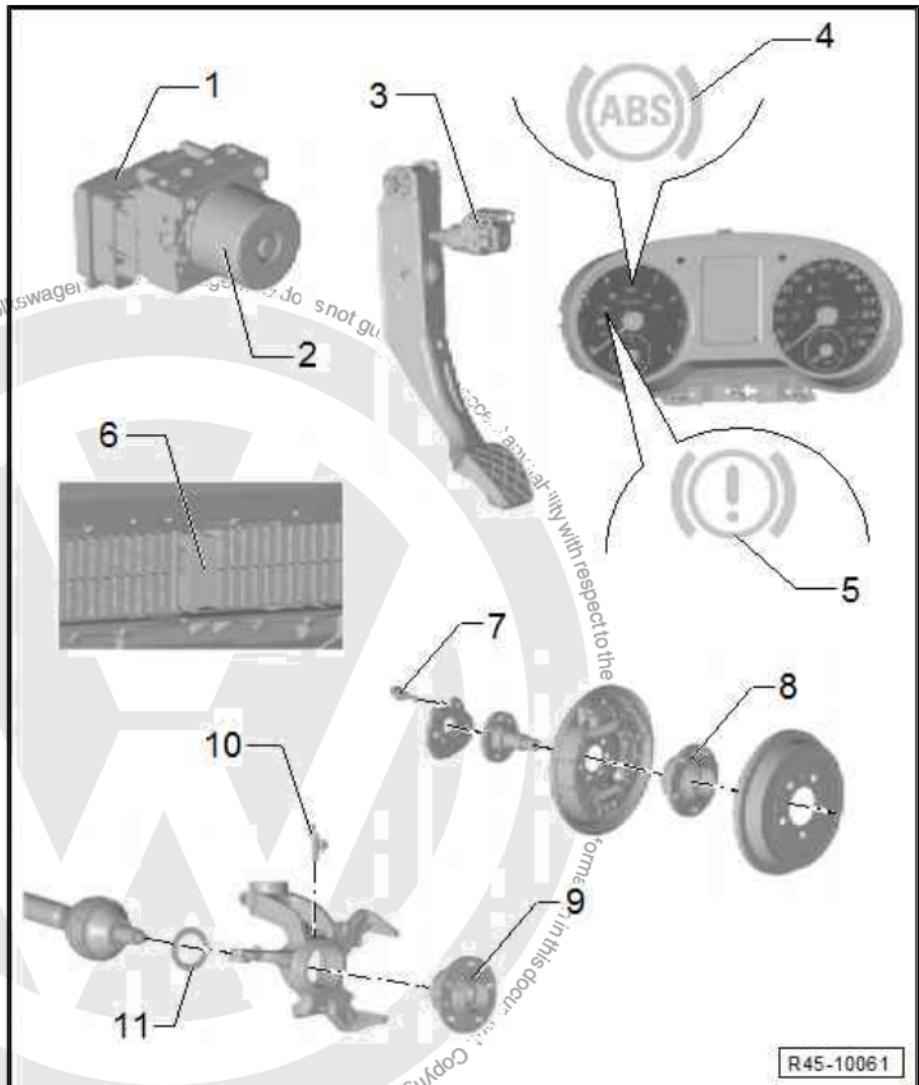
- the ABS sensor ring is assembled in the wheel roller bearing.



7.3 ABS Bosch 8.2

1 - ABS control unit - J104-

- may be checked by the "Assisted Troubleshooting" with Vehicle diagnostic, testing and information system - VAS 5051A /52-
- do not disconnect the command unit connector before the self-diagnosis.
- remove and install
⇒ [page 28](#).



R45-10061

3 - Brake light switch - F- or Brake pedal switch - F47-

- remove and install
⇒ [page 89](#).

4 - Brake system control lamp - K118-

- Installation location: dash panel

Function: ⇒ [page 35](#).

5 - ABS control lamp - K47-

- Installation location: dash panel.

Function: ⇒ [page 35](#).

6 - Diagnosis connector

- Installation location: Next to the fuse box, under the steering column.

7 - Right rear wheel rotation sensor - G44- / Left rear wheel rotation sensor - G46-

- may be checked by the "Assisted Troubleshooting" with Vehicle diagnostic, testing and information system - VAS 5051A /52-
- remove and install
⇒ [page 43](#).

8 - Rear wheel hub/roller bearing assembly

- the ABS sensor ring is assembled in the wheel roller bearing.

9 - Front wheel hub/roller bearing assembly

- the ABS sensor ring is assembled in the wheel roller bearing



10 - Right front wheel rotation sensor - G45- / Left front wheel rotation sensor - G47-

- may be checked by the "Assisted Troubleshooting" with Vehicle diagnostic, testing and information system - VAS 5051A /52-
- remove and install [⇒ page 37](#).

11 - Centrifuging disc

- Only for vehicles with ABS brakes.

7.4 ABS Bosch 9.0

1 - ABS control unit - J104-

- may be checked by the "Assisted Troubleshooting" with Vehicle diagnostic, testing and information system - VAS 5051A /52-
- do not disconnect the command unit connector before the self-diagnosis.
- remove and install [⇒ page 28](#).

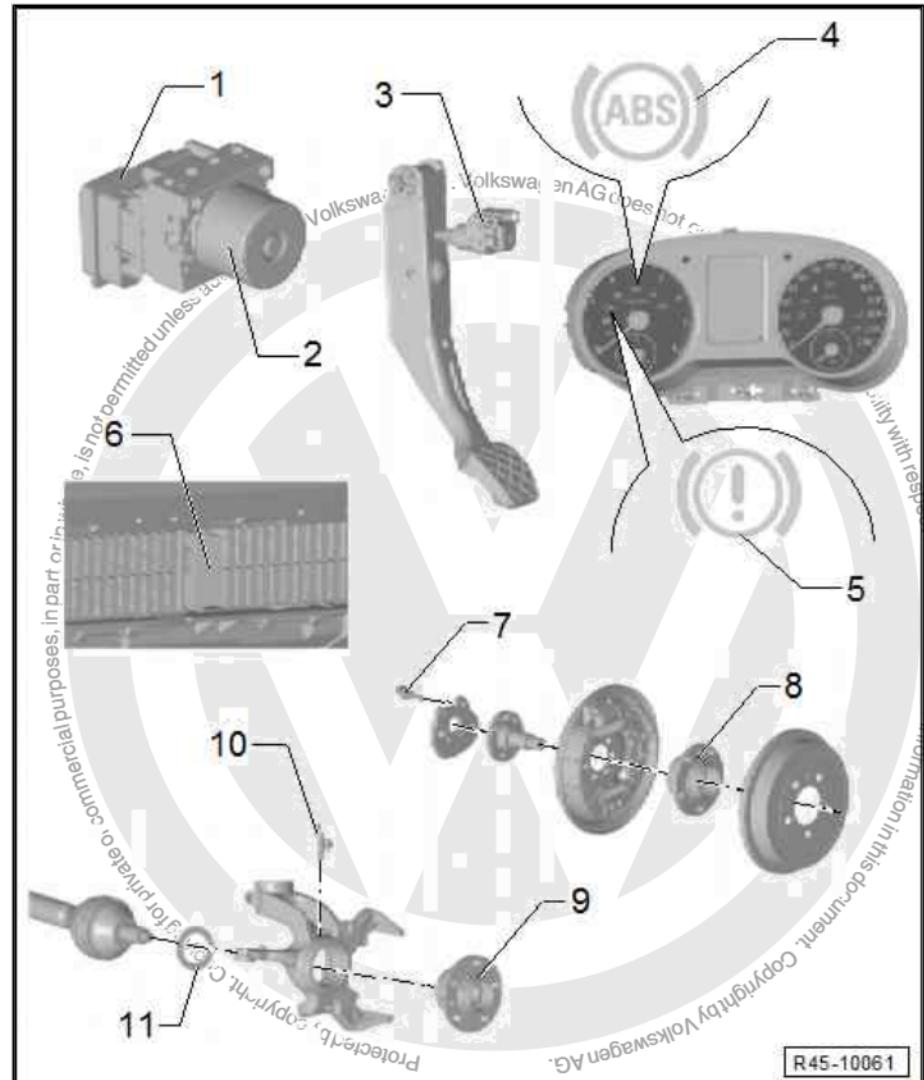
2 - ABS hydraulic unit - N55-

The hydraulic unit comprises the following components:

- ABS return pump - V39-
- may be checked on the "Assisted Troubleshooting" function in the Vehicle diagnostic, testing and information system - VAS 5051A /52-
- valve block (includes intake and exhaust valves)
- ABS reflux pump - V39- and the valves may not be separated
- remove and install [⇒ page 28](#).

3 - Brake light switch - F- or Brake pedal switch - F47-

- remove and install [⇒ page 89](#).



4 - Brake system control lamp - K118-

- installation location: dash panel

Function: [⇒ page 35](#).

5 - ABS control lamp - K47-

- Installation location: dash panel.

Function: [⇒ page 35](#).

6 - Diagnosis connector

- Installation location: Next to the fuse box, under the steering column.



7 - Right rear wheel rotation sensor - G44- / Left rear wheel rotation sensor - G46-

- may be checked by the "Assisted Troubleshooting" with Vehicle diagnostic, testing and information system - VAS 5051A /52-
- remove and install [⇒ page 43](#).

8 - Rear wheel hub/roller bearing assembly

- the ABS sensor ring is assembled in the wheel roller bearing.

9 - Front wheel hub/roller bearing assembly

- the ABS sensor ring is assembled in the wheel roller bearing

10 - Right front wheel rotation sensor - G45- / Left front wheel rotation sensor - G47-

- may be checked by the "Assisted Troubleshooting" with Vehicle diagnostic, testing and information system - VAS 5051A /52-
- remove and install [⇒ page 37](#).

11 - Centrifuging disc

- Only for vehicles with ABS brakes.





8 Hydraulic unit, brake servo/brake master cylinder - assembly overview (Bosch 5.7)

The brake master cylinder and the brake servo may be replaced independently of one another.



WARNING

Always replace self-locking nuts and bolts subject to angular torque

asdasd

1 - ABS control unit - J104-

- Remove and install
[⇒ page 20](#).

2 - ABS hydraulic unit - N55-

- ABS hydraulic pump - V64- and the intake and exhaust valves are checked through self-diagnosis on the hydraulic unit
- ABS hydraulic pump - V64- and the valve block may not be separated.
- When replacing the hydraulic unit, seal the old part with the plugs from the repair set number ET 1H0 698 311 A.
- Remove and install
[⇒ page 20](#).

3 - External bolt

- 3 Nm

4 - Brake pressure sensor 1 - G201-

- remove and install
[⇒ page 25](#).

5 - Brake pipe connection

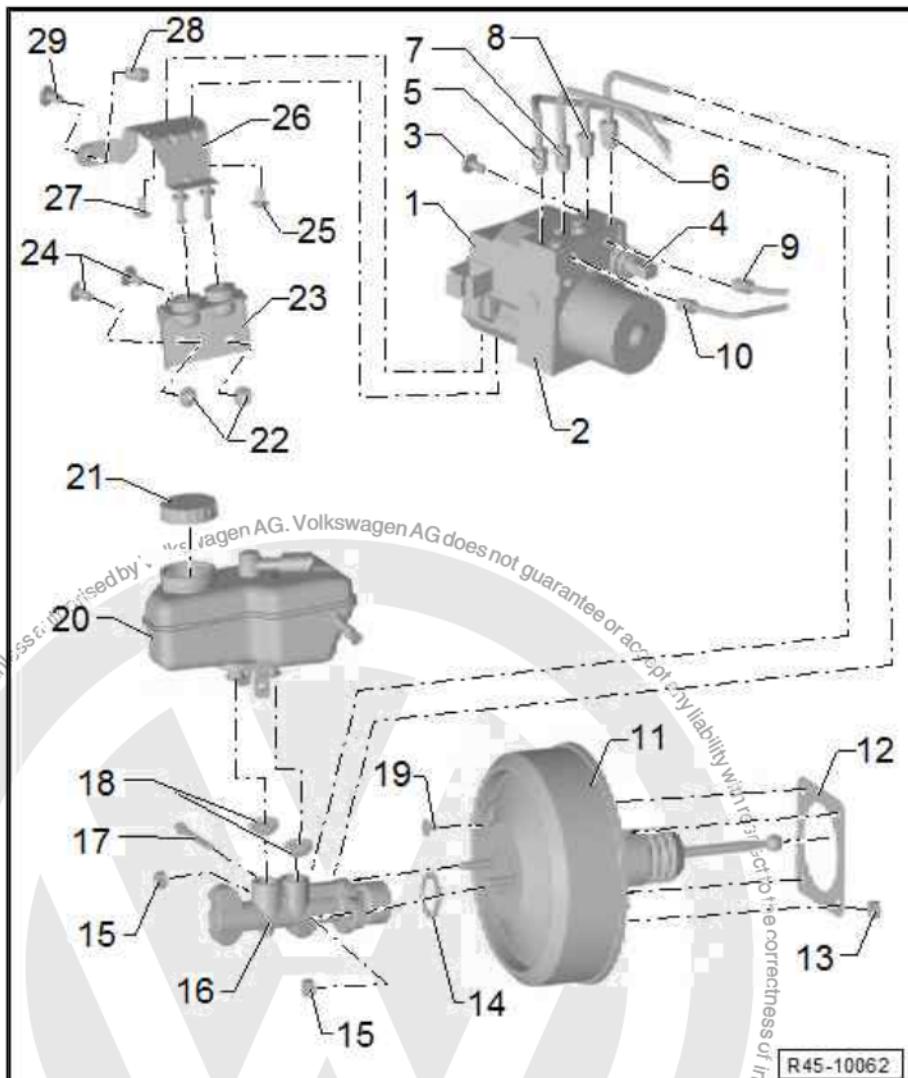
- Hydraulic unit for left front brake caliper.
- Identification in the hydraulic unit -VL-.
- 14 Nm

6 - Brake pipe connection

- Hydraulic unit for right front brake caliper.
- Identification in the hydraulic unit -VR-.
- 14 Nm

7 - Brake pipe connection

- Brake master cylinder/floating plunger circuit for the hydraulic unit.
- Identification in the hydraulic unit -HZ2-.





- 14 Nm

8 - Brake pipe connection

- Brake master cylinder/push rod circuit for the hydraulic unit
- Identification in the hydraulic unit -HZ1-.
- 14 Nm

9 - Brake pipe connection

- for the left rear brake caliper.
- Identification in the hydraulic unit -HL-.
- 14 Nm

10 - Brake pipe connection

- for the right rear brake caliper.
- Identification in the hydraulic unit -HR-.
- 14 Nm

11 - Brake servo

- On petrol engines, the vacuum required is removed from the intake manifold.
- In diesel engines, there is a vacuum pump to create vacuum.
- Check functioning:
 - Press the brake pedal all the way several times with the engine stopped (This eliminates any remaining vacuum inside the device).
 - Keep the brake pedal depressed with medium foot pressure in the braking position, and start the engine. If the brake servo is operating properly, the foot on the brake pedal goes down (amplification is active).
- In case of faults, replace completely.
- Non-return valve (in the vacuum line) ⇒ [page 93](#).
- Disassemble from the brake pedal ⇒ [page 86](#).
- Remove and install ⇒ [page 93](#).

12 - Sealing

- to brake servo.

13 - Self-locking hex head nut

- 28 Nm.
- Replace whenever removed

14 - Sealing ring

- Replace whenever removed

15 - Self-locking hex head nut

- 20 Nm.
- Replace whenever removed

16 - Brake master cylinder

- cannot be repaired. Where faults occur, replace completely.
- remove and install ⇒ [page 92](#).

17 - Retaining pin for the brake fluid reservoir

- insert through the brake master cylinder.

18 - Sealing plug

- moisten with brake fluid and press into the brake master cylinder.

19 - Sealing plug

- Connection for vacuum line.



- 20 - Brake fluid reservoir
- 21 - Sealing plug
- 22 - Self-locking hex head nut
 - Replace whenever removed
 - 20 Nm
- 23 - Mounting bracket
- 24 - Stud
 - Stud welded to the body.
- 25 - Bolts
 - 8 Nm.
- 26 - Mounting bracket
- 27 - Bolts
 - 8 Nm.
- 28 - Self-locking hex head nut
 - Replace whenever removed
 - 20 Nm.
- 29 - Stud
 - Stud welded to the body.

8.1 Hydraulic unit connections

8.1.1 Connecting the brake pipes from brake master cylinder pipes (Tandem) to the hydraulic unit

A - Hydraulic unit to the brake master cylinder pressure plunger circuit.

- Identification in the hydraulic unit -HZ1-.

B - Hydraulic unit to the brake master cylinder floating pressure plunger circuit.

- Identification in the hydraulic unit -HZ2-.

1 - Hydraulic unit for left front brake caliper.

- Identification in the hydraulic unit -VL-.

2 - Hydraulic unit for right front brake caliper.

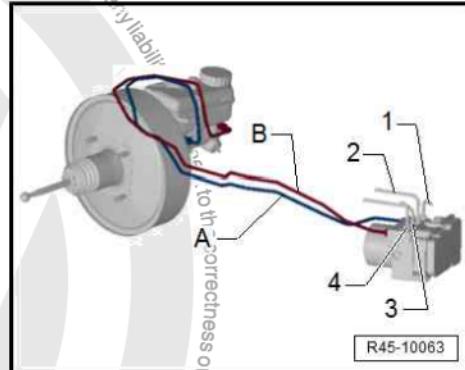
- Identification in the hydraulic unit -VR-.

3 - Hydraulic unit to right rear brake caliper.

- Identification in the hydraulic unit -HR-.

4 - Hydraulic unit to left rear brake caliper.

- Identification in the hydraulic unit -HL-.

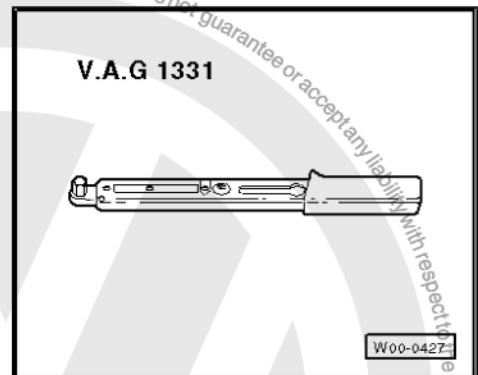


8.2 Command unit for hydraulic unit - remove and install

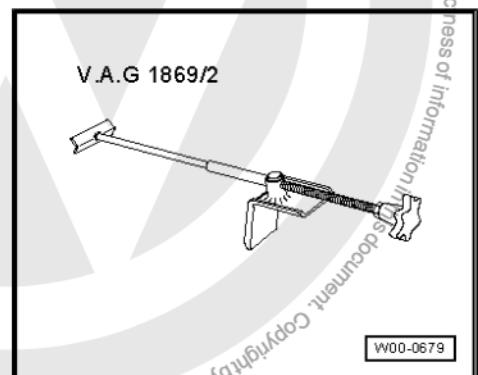
Special tools and workshop equipment required



- ◆ Torque wrench - 5 to 50Nm (1/2" drive) - VAG 1331-



- ◆ Brake pedal pressing device - VAG 1869/2-

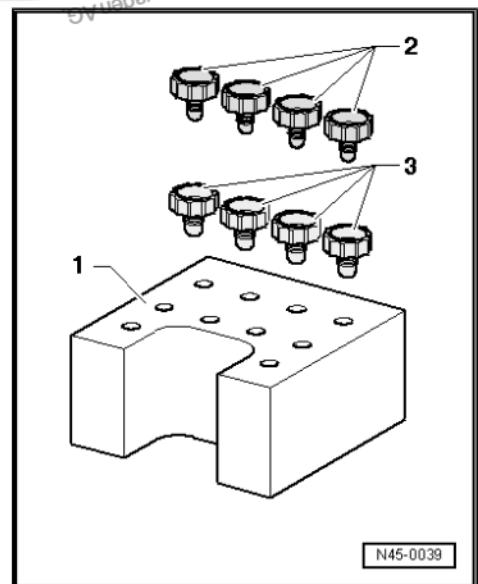


Plug repair set 1H0 698 311 A

After disconnecting the ABS hydraulic unit - N55- from ABS control unit - J104- , always fit on the hydraulic unit the valve tube transport protection.

ABS hydraulic units - N55- without the transport protection are not covered by warranty.

- 1 - Valve tube transport protection.
- 2 - M 10 Plugs.
- 3 - M 12 Plugs.



8.2.1 Removal

Installation location:

The command unit is screwed onto the hydraulic system unit and is found in the right side of the engine compartment.



WARNING

The brake lines near ABS hydraulic unit - N55- cannot be bent.

- Note the coding in vehicles with code radio equipment, request such coding if necessary.



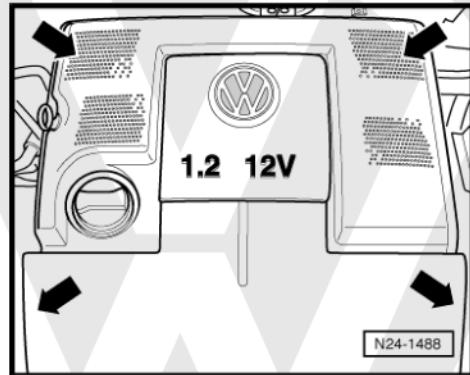
- Disconnect the battery ⇒ Electrical system; Rep. gr. 27 ;
Starter, alternator, battery .

3 cylinders, injection engine:

- Disconnect the vacuum lines from the upper air filter case section.
- Remove the cover by the points marked with -arrows-.

4 cylinders, injection engine:

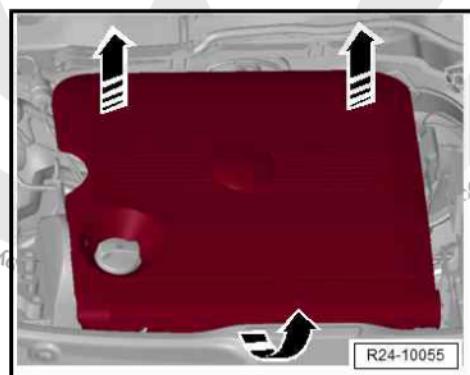
- Pull the hose from the oil separator and the non-return valve on the upper air filter case section.



- Remove the cover by the points marked with -arrows-.

3-cylinder diesel engine

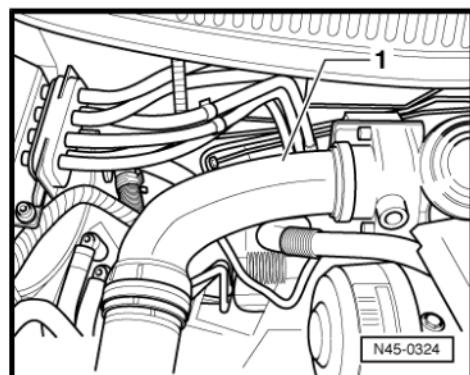
- Pull the engine cover up and away from the fittings.



- Remove the intake hose -1-.

4-cylinder diesel engine with injector pump unit:

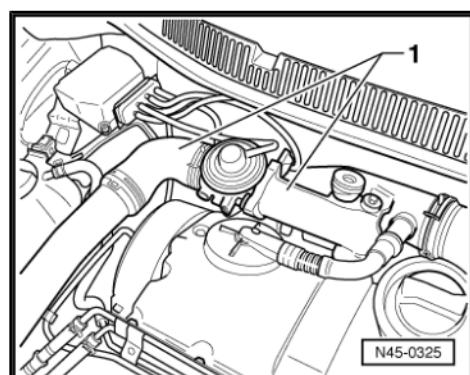
- Pull the engine cover up and away from the fittings.



- Remove the intake hose and tube -1-.

4 cylinders, diesel engine with distribution injector pump:

- Pull the engine cover up and away from the fittings.

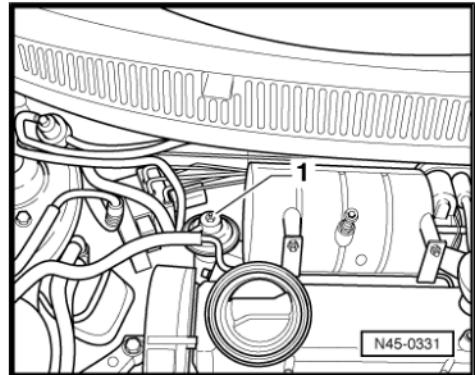




- Remove the escape gas return valve -1-.

Continuation for all vehicles:

- Disconnect the connector for the braking pressure sensor
 Brake pressure sensor 1 - G201- -2-.

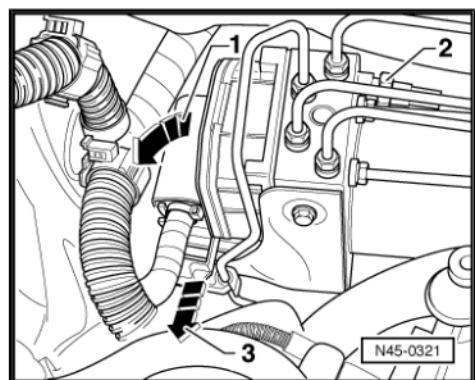


- Unlock -arrow 1- and disconnect -arrow 3- the control unit connector ABS hydraulic unit - N55- .
- Install the Brake pedal pressing device - VAG 1869/2- .
- Press the brake pedal with the actuator.
- Place the venting hose of the venting reservoir over the left front brake caliper plug and open the plug.
- Close the left front venting plug.
- Place a sufficient amount of non-fraying cloths under ABS control unit - J104- and ABS hydraulic unit - N55- .

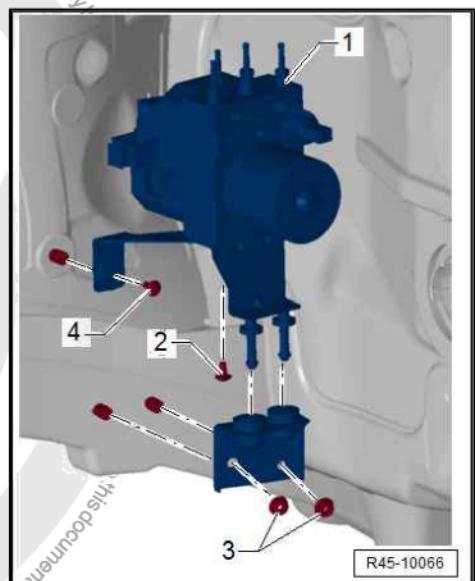


WARNING

Make sure no brake fluid does not get on the contacts for ABS control unit - J104-.



- Loosen and hang the hydraulic unit brake pipes -1- to the brake master cylinder.
- Release the remaining brake pipes for the ABS hydraulic unit - N55- .
- Close the brake pipes and threaded holes with plugs from the number 1H0 698 311 A repair set.
- Remove the hexagonal nuts -3- and -5- from the command unit/hydraulic unit support.
- Remove ABS hydraulic unit - N55- from ABS control unit - J104- .
- Unscrew the bolts -2- and -4- and remove the command unit/hydraulic unit support.





8.2.2 Installation



Note

Only remove the plugs from the new ABS hydraulic unit - N55- when the respective brake pipe is assembled. If the plugs were already removed from ABS hydraulic unit - N55-, brake fluid may leak to the point that proper ventilation and filling can no longer be guaranteed.

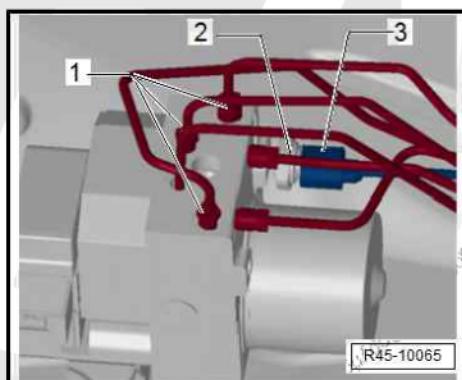
- Install the ABS unit on the support.
- Installation is performed in the reverse sequence of the removal.
- Bleed the brake system [⇒ page 114](#)
- Code the ABS control unit - J104- control unit.

Connect the Vehicle diagnostic, testing and information system - VAS 5051A /52- and select the function [⇒ page 10](#).

- Codify the radio.

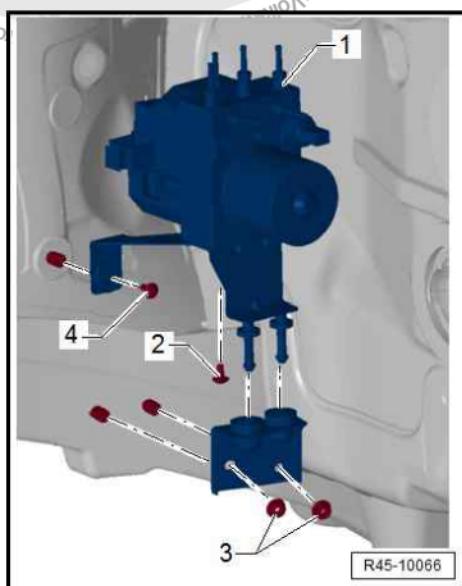
Brake line tightening torques:

ABS Bosch - (5.7)		
Positions	Component	Torque
-1-	Brake lines	14 Nm
-2-	Brake pressure sensor 1 - G201- .	14 Nm



Tightening torques for fastening the ABS unit and supports:

ABS Bosch - (5.7)		
Positions	Nuts / Bolts	Torque
-2 / 4-	Bolt	8 Nm
-3-	Hexagonal nut	20 Nm
-5-	Hexagonal nut	20 Nm





8.3 Brake pressure sensor 1 - G201- - remove and install

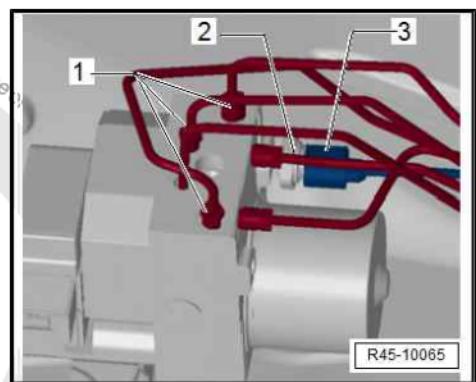
8.3.1 Removal

Depending on engine version, remove the air filter or the engine cover, as described below:

- ◆ 3 cylinders, injection engine [⇒ page 22](#).
- ◆ 4 cylinders, injection engine [⇒ page 22](#).
- ◆ 3-cylinder diesel engine [⇒ page 22](#).
- ◆ 4-cylinder diesel engine with injector pump unit [⇒ page 22](#).
- ◆ 4 cylinders, diesel engine with distribution injector pump [⇒ page 22](#).

Continuation for all vehicles:

- Disconnect connector -3- from Brake pressure sensor 1 - G201- -2-.
- Place a sufficient amount of non-fraying cloths under ABS control unit - J104- and ABS hydraulic unit - N55-.
- Release brake pipes -1- from ABS hydraulic unit - N55- .
- Close the brake pipes and threaded holes with plugs from the number 1H0 698 311 A repair set.
- Remove Brake pressure sensor 1 - G201- .



8.3.2 Installation

- Installation is carried out by reversing the removal order, considering the following:
- Tighten Brake pressure sensor 1 - G201- with a torque of 14 Nm [⇒ page 24](#).
- Bleed the brake system [⇒ page 114](#)



9 Hydraulic unit, brake servo/brake master cylinder - assembly overview (Bosch 8.0 / 8.2)

The brake master cylinder and the brake servo may be independently replaced.



WARNING

Always replace self-locking nuts and bolts subject to angular torque

1 - ABS control unit - J104-

- Remove and install ABS hydraulic unit - N55- along with ABS control unit - J104-.
[⇒ page 28 .](#)

2 - ABS hydraulic unit - N55-

- ABS reflux pump - V39- and the coupled valves may not be separated.
- When replacing ABS hydraulic unit - N55-, seal the old part with the plugs from the repair set number ET 1H0 698 311 A.
- Remove and install ABS hydraulic unit - N55- along with ABS control unit - J104-.
[⇒ page 28 .](#)

3 - Brake pipe connection

- Hydraulic unit for right front brake caliper.
- Identification in the hydraulic unit -VR-.

4 - Brake pipe connection

- for the left rear brake caliper.
- Identification in the hydraulic unit -HL-.

5 - Brake pipe connection

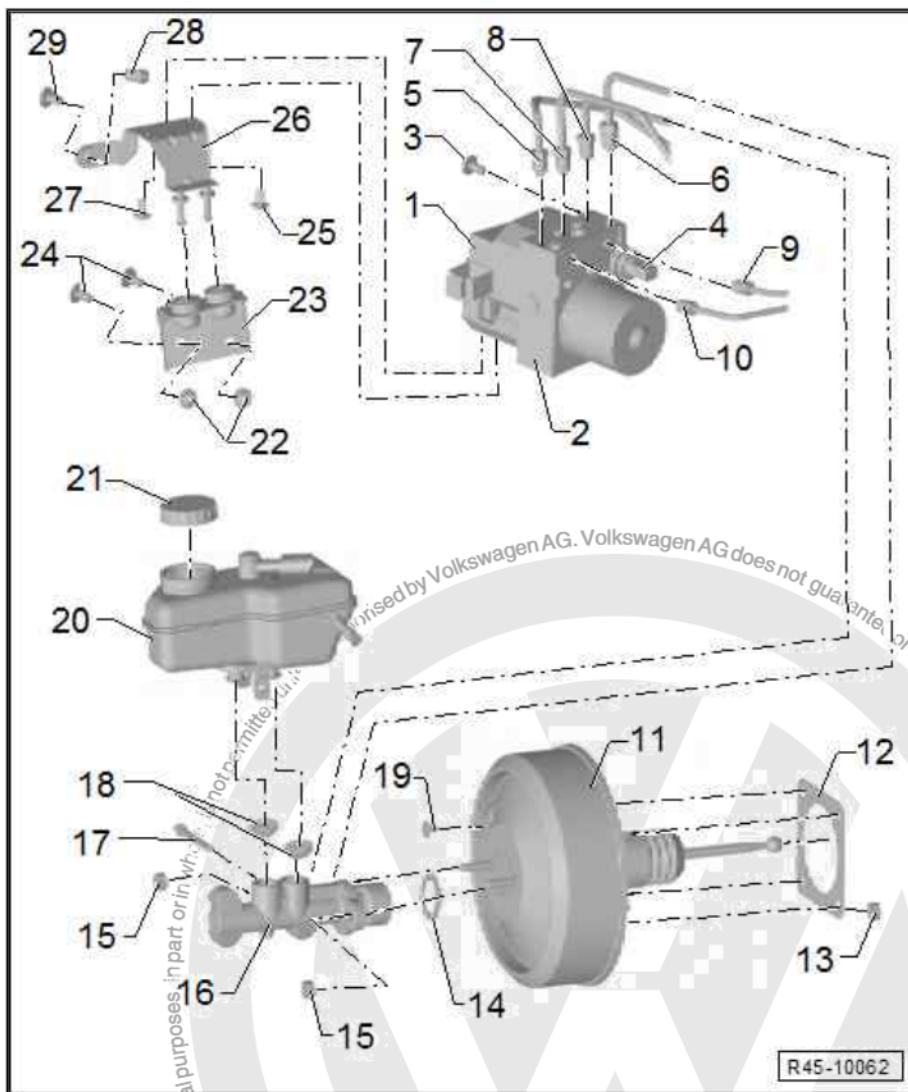
- for the right rear brake caliper.
- Identification in the hydraulic unit -HR-.

6 - Brake pipe connection

- Hydraulic unit for left front brake caliper.
- Identification in the hydraulic unit -VL-.

7 - Brake master cylinder connection

- Brake master cylinder/floating plunger circuit for the hydraulic unit.
- Identification in the hydraulic unit -HZ1-.





8 - Brake master cylinder connection

- Brake master cylinder/floating plunger circuit for the hydraulic unit.
- Identification in the hydraulic unit -HZ2-.

9 - Sealing

- to brake servo.

10 - Brake servo

- On petrol engines, the vacuum required is removed from the intake manifold.
- On diesel engines, a vacuum pump is installed to create vacuum.

Operation checking:

- Press the brake pedal several times until the end with the engine stopped (This eliminates any remaining vacuum inside the device).
- Now, keep the brake pedal pressed in the braking position with medium force and start the engine. When the brake servo is working properly, this can be felt with a foot on the brake pedal (the amplification is active).
 - In case of faults, replace completely.
 - Non-return valve (in the flexible vacuum line) [⇒ page 93](#).
 - separate from the brake pedal [⇒ page 86](#).

11 - Self-locking hex head nut

- Replace whenever removed
- 28 Nm.

12 - Sealing ring

- Replace whenever removed

13 - Self-locking hex head nut

- Replace whenever removed
- 20 Nm.

14 - Brake master cylinder

- cannot be repaired. Where faults occur, replace completely.
- remove and install [⇒ page 92](#).

15 - Retaining pin for the brake fluid reservoir

- insert through the brake master cylinder.

16 - Sealing plug

- moisten with brake fluid and press into the brake master cylinder.

17 - Sealing plug

- connection to flexible vacuum line.

18 - Brake fluid reservoir

19 - Sealing plug

20 - Bolts

- 8 Nm.

21 - Self-locking hex head nut

- Replace whenever removed
- 20 Nm.

22 - Mounting bracket

23 - Stud

- Stud welded to the body.

24 - Self-locking hex head nut

- Replace whenever removed



20 Nm.

25 - Stud

Stud welded to the body.

26 - Mounting bracket

9.1 Hydraulic unit connections

Connect the brake pipes and the brake master cylinder pipes to the hydraulic unit:

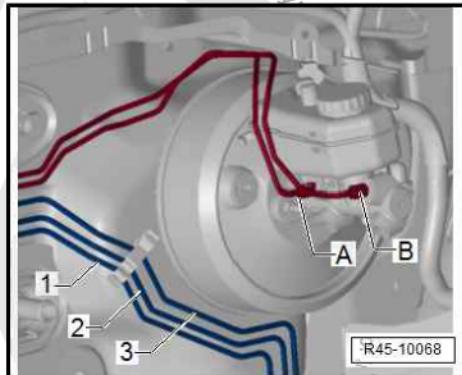
A - Hydraulic unit to the brake master cylinder pressure plunger circuit (14 Nm).

B - Hydraulic unit to the brake master cylinder pressure plunger circuit (14 Nm).

1 - Hydraulic unit to right rear brake caliper.

2 - Hydraulic unit to left rear brake caliper.

3 - Hydraulic unit for left front brake caliper.



On the hydraulic system unit:

A - Hydraulic unit to the brake master cylinder pressure plunger circuit.

- Identification in the hydraulic unit -HZ1-.

B - Hydraulic unit to the brake master cylinder floating pressure plunger circuit.

- Identification in the hydraulic unit -HZ2-.

1 - Hydraulic unit for right front brake caliper.

- Identification in the hydraulic unit -VR-.

2 - Hydraulic unit to left rear brake caliper.

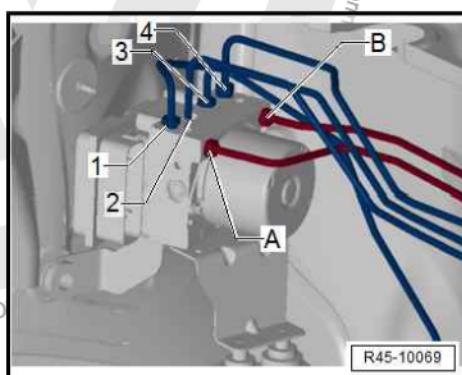
- Identification in the hydraulic unit -HL-.

3 - Hydraulic unit to right rear brake caliper.

- Identification in the hydraulic unit -HR-.

4 - Hydraulic unit for left front brake caliper.

- Identification in the hydraulic unit -VL-.



9.2 ABS control unit - J104- on ABS hydraulic unit - N55- - remove and install

Special tools and workshop equipment required



- ◆ Torque wrench - 5 to 50Nm (1/2" drive) - VAG 1331-

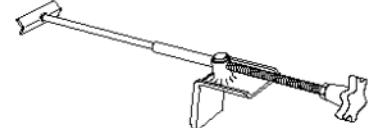
V.A.G 1331



W00-0427

- ◆ Brake pedal pressing device - VAG 1869/2-

V.A.G 1869/2



W00-0679

Plug repair set 1H0 698 311 A

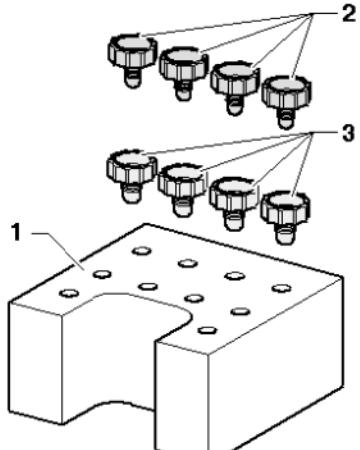
After disconnecting ABS control unit - J104- from ABS hydraulic unit - N55- , always fit on the hydraulic unit the valve tube transport protection.

Hydraulic units without the transport protection are not covered by warranty.

1 - Valve tube transport protection.

2 - M 10 Plugs.

3 - M 12 Plugs.



N45-0039



9.2.1 Removal

Installation location:

ABS control unit - J104- is fastened to ABS hydraulic unit - N55- and is located in the engine compartment, right side -arrow-.



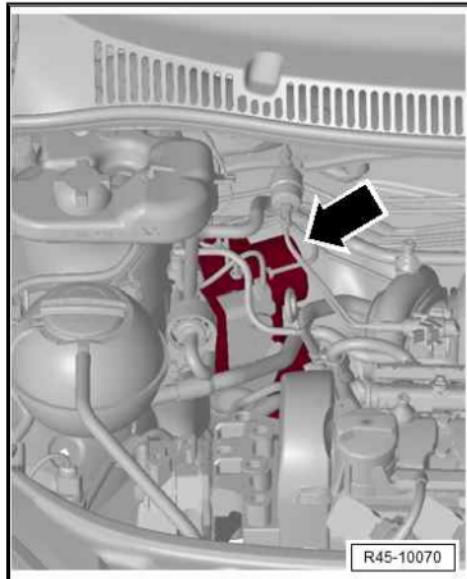
WARNING

The brake pipes in the hydraulic unit area must not be bent.

- Note the coding in vehicles with code radio equipment, request such coding if necessary.
- Disconnect the battery ⇒ Electrical system; Rep. gr. 27 ; Starter, alternator, battery .

3 cylinders, injection engine:

- Disconnect the vacuum lines from the upper air filter case section.

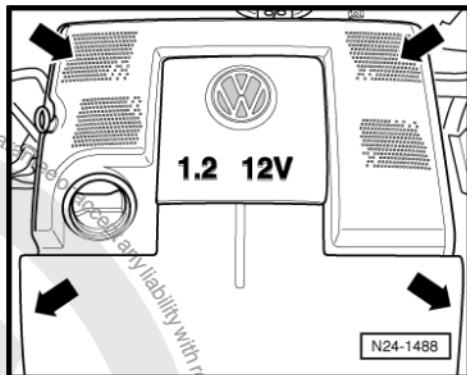


R45-10070

- Remove the cover by the points marked with -arrows-.

4 cylinders, injection engine:

- Pull the hose from the oil separator and the non-return valve on the upper air filter case section.

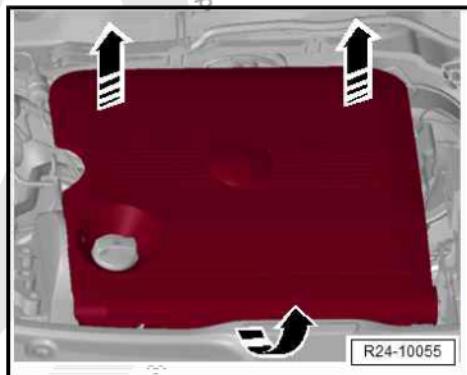


N24-1488

- Remove the cover by the points marked with -arrows-.

3-cylinder diesel engine:

- Pull the engine cover up and away from the fittings.



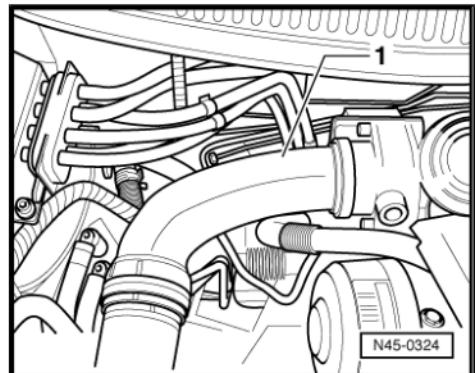
R24-10055



- Remove the intake hose -1-.

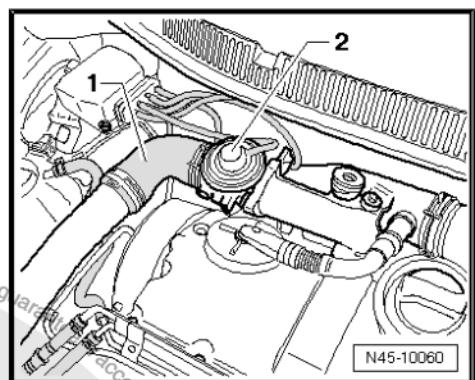
4-cylinder diesel engine with injector pump unit:

- Pull the engine cover up and away from the fittings.



- Remove hose -1- and intake tube -2- ⇒ Engine; Rep. gr. 23 ; Supply system - fuel injection (diesel) .

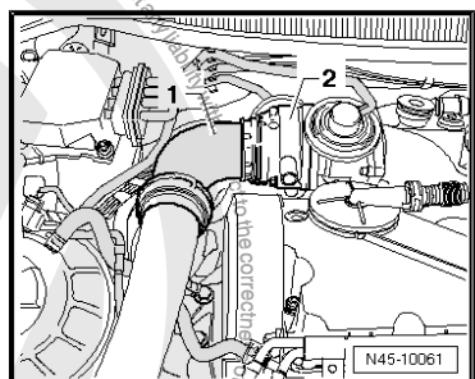
or:



- Remove flexible suction tube-1- and Motor for intake manifold valve - V157--2-⇒ Engine; Rep. gr. 23 ; Supply system - fuel injection (diesel) .

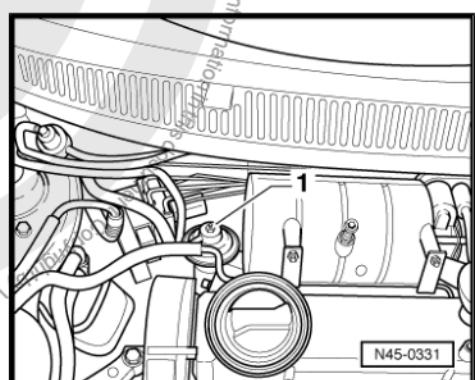
4 cylinders, diesel engine with distribution injector pump:

- Pull the engine cover up and away from the fittings.



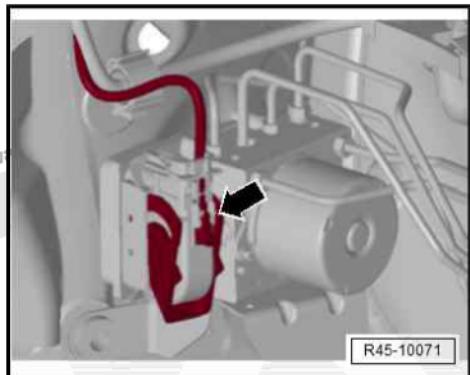
- Remove the escape gas return valve -1-.

Continuation for all vehicles:

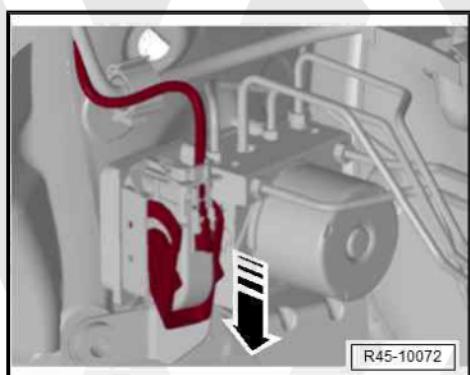




- Push down the connector safety lock -arrow- .



- Release the connector for ABS control unit - J104- -arrow- and remove it by pulling it forward
- Install the Brake pedal pressing device - VAG 1869/2- .
- Press the brake pedal with the Brake pedal pressing device - VAG 1869/2- already positioned.
- Close the left front venting plug.
- Place the hose from the bleeding reservoir over the left front brake caliper plug and open the plug.

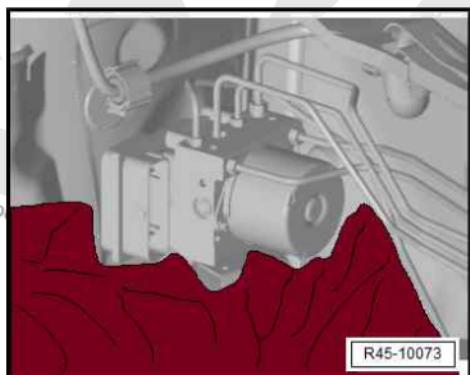


- Place a sufficient amount of non-fraying cloths under ABS control unit - J104- and ABS hydraulic unit - N55- .



WARNING

Make sure no brake fluid does not get on the contacts for ABS control unit - J104- .



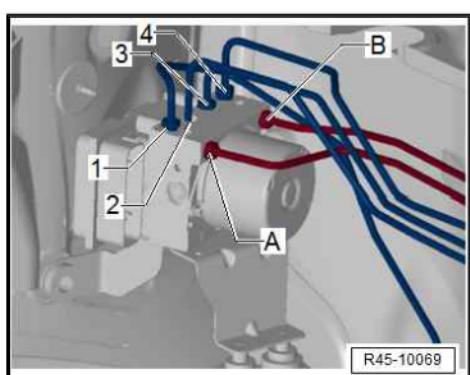
- Loosen and hang brake pipes-A-B-1-2-3-4- from the brake master cylinder hydraulic unit.



Note

To avoid excessive leaking of brake fluid, use the exhaust valve protection cover to seal brake lines -A and B-.

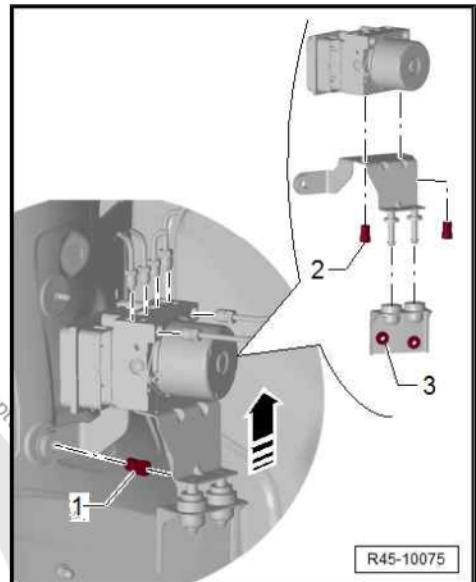
- Close the brake pipes and threaded holes with plugs from the number 1H0 698 311 A repair set.





- Remove hexagonal nut -1- from the ABS control unit - J104- / ABS hydraulic unit - N55- support
- Carefully remove ABS control unit - J104- / ABS hydraulic unit - N55- , pulling it up -arrow-.
- Remove the command device / hydraulic unit support by removing bolts -2-.

There is no need to remove the lower ABS support by removing nuts -3-.



R45-10075

9.2.2 Installation



Note

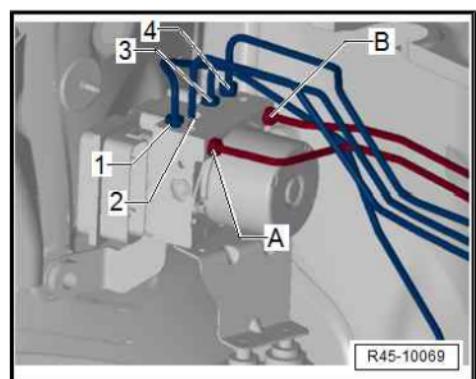
- ◆ Only remove the plugs from the new hydraulic unit when the respective brake pipe is assembled.
 - ◆ If the plugs were already removed from the hydraulic unit, the brake fluid may leak to the point that proper venting and filling can no longer be ensured.
- Install the ABS unit on the support.
 - The rest of the installation is processed in the reverse order from removal.
 - Remove the Brake pedal pressing device - VAG 1869/2
 - Bleed the brake system [⇒ page 114](#) .
 - Code ABS control unit - J104- .

Connect the Vehicle diagnostic, testing and information system - VAS 5051A /52- and select the function [⇒ page 10](#) .

- Codify the radio.

Brake line tightening torques:

ABS Bosch - (8.0 / 8.2)	
Brake pipes in the ABS set: -A-B-1-2-3-4-	
Threads M 10 x 1	14 Nm
Threads M 12 x 1	14 Nm

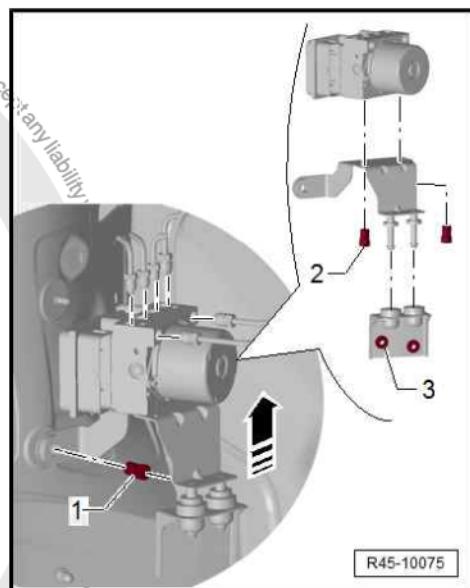


R45-10069



Tightening torques for fastening the ABS unit and supports:

ABS Bosch - (8.0 / 8.2)		
Positions	Nuts / Bolts	Torque
-1-	Hexagonal nut	20 Nm
-2-	Bolt	8 Nm
-3-	Hexagonal nut	20 Nm



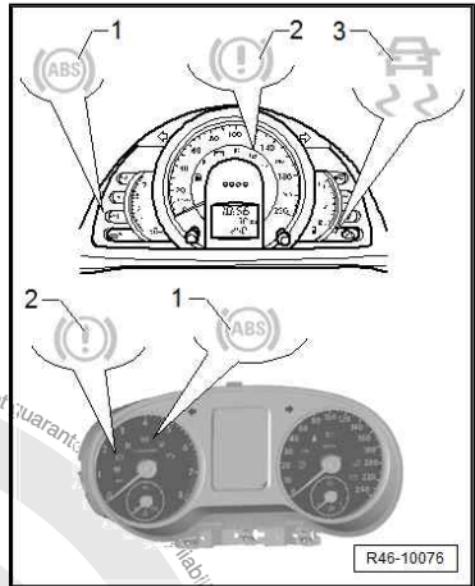


10 Fault indication via control lights

10.1 Control lights

Pos.	Nomenclature
-1-	ABS control light - K47- .
-2-	Brake system control light - K118- .
-3-	ASR and ESP control light - K155- .

ABS control light - K47- :



- ◆ If ABS control light - K47- for ABS -1- does not go off after the ignition is turned on and after the inspection is over, the fault may have the following causes:

- a- the voltage supply is below 10 Volt.
- b- there is a fault in the ABS.

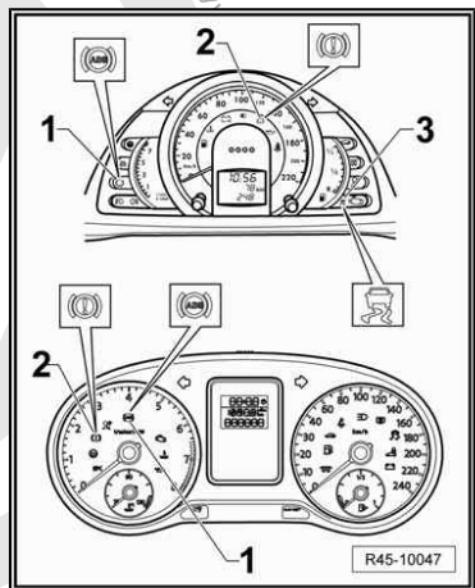
In the case of a fault in the ABS -b-, the antilock braking system is turned off, while the conventional brake system remains fully operational.

-c- there was a temporary fault in the speed sensor from the last time the vehicle was started.

In the case of speed sensor -c- the ABS control light - K47- automatically goes off after the vehicle is started and at a speed higher than 20 km/h.

-d- there is an interruption in the connection between the dash panel and ABS control unit - J104- . ⇒ Electrical diagrams, diagnosis of electrical faults and installation locations .

ABS control light - K47- and Brake system control light - K118- .





- ♦ If ABS control light - K47- for ABS -1- turns off, while Brake system control light - K118- for brake system -2- remains on, the error may have the following causes:

-A- The handbrake is on.

-B- The brake fluid level is too low.

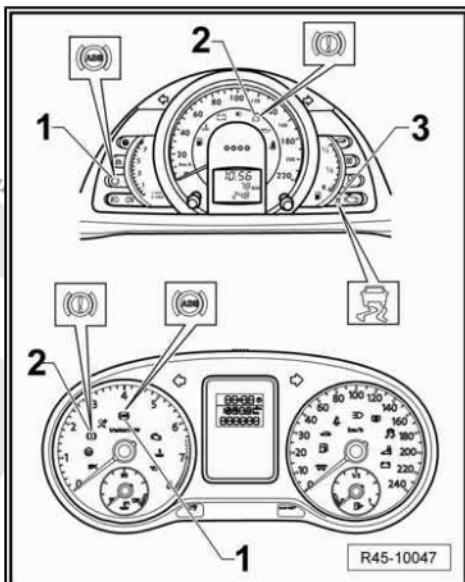
-C-: activation failure in of Brake system control light - K118- for the brake system. ⇒ Electrical diagrams, diagnosis of electrical faults and installation locations

- ♦ If ABS control light - K47- for ABS -1- and Brake system control light - K118- for the brake system are lit -2- it means that the ABS system and the EBV (electronic braking power distribution) have failed.



WARNING

After the ABS control light - K47- from the ABS and Brake system control light - K118- from the brake system turn on, the rear wheels may lock early during braking.



ASR and ESP control light - K155- :

- ♦ If the ESP and ASR control light - K155- for the ASR/ESP stabilization program -3- does not go off after the ignition is switched on and after the inspection ends, the fault may have the following causes:

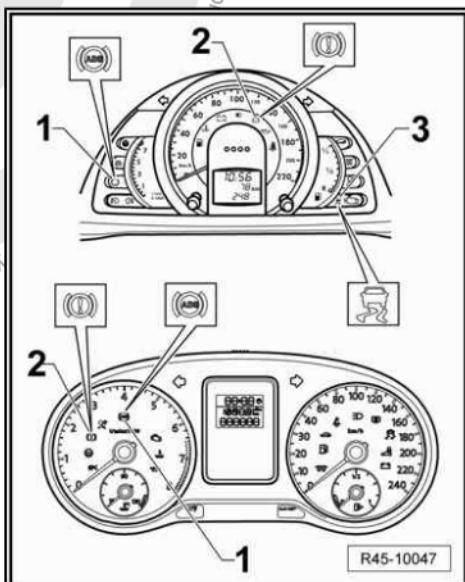
-a- Short-circuit to positive in Switch for the ASR/ESP electronic stability program - E256-

-b- A fault in switching the ESP and ASR control light - K155- for the stabilization program, ASR/ESP ⇒ Electrical diagrams, diagnosis of electrical faults and installation locations

-c- The Switch for the ASR / ESP electronic stability program - E256- .

There is a fault exclusively related to the ASR/ESP. The vehicle's ABS/EDS and EBV safety systems remain fully operational ⇒ Refer to the event memory.

If the ESP and ASR control light - K155- for the ASR/ESP stabilization program blinks during the drive, then the ASR or ESP system is in adjustment mode.





11 ABS system components on the front and rear axles - remove and install

11.1 ABS system components on the front axle - remove and install

1 - Wheel roller bearing case

2 - Internal hex head bolt

- 8 Nm

3 - ABS speed sensor

- is checked through self-diagnosis.
- before putting the sensor, clean the internal hole surface and coat with lubricating putty - G 052 142 A2- or G 052 112 A3 - lubricating putty- around the sensor. Refer to the ⇒ Chemicals Manual .
- remove and install
⇒ [page 37](#) .

4 - Cover plate

5 - Hexagonal head bolt

- 12 Nm

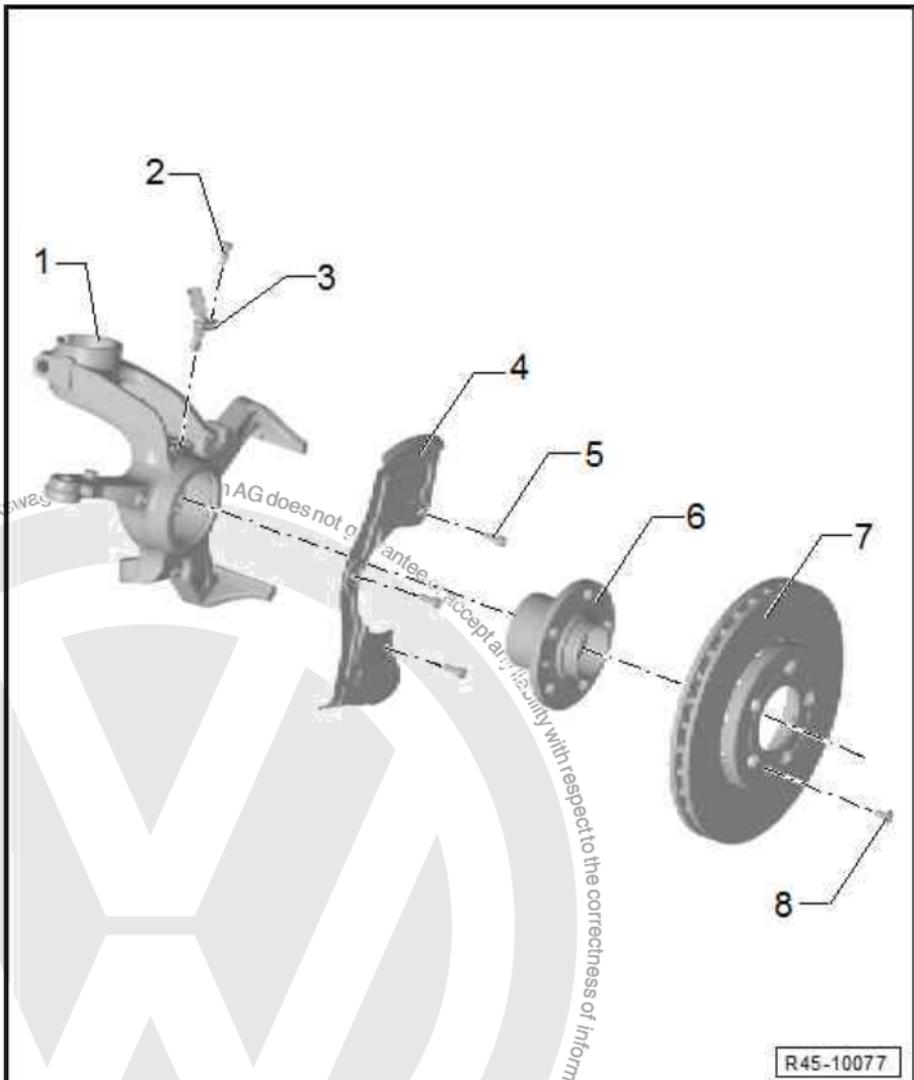
6 - Wheel hub with roller bearing

- this ABS sensor ring is assembled in the wheel hub.
- remove and install ⇒ Running gear, axles, steering; Rep. gr. 40 ; Front suspension .

7 - Brake disc

8 - Bolt

- 8 Nm.



R45-10077

11.2 Front axle speed sensor - remove and install

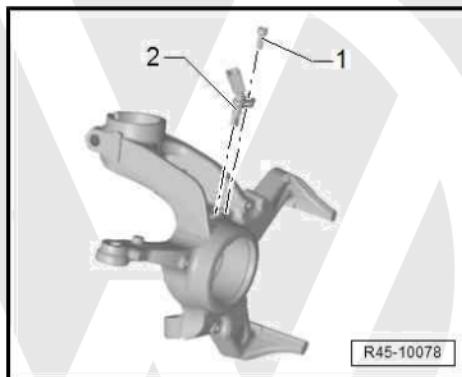
11.2.1 Removal

- Jack the vehicle.



- Disconnect connector -2- from the speed sensor cable and from the speed sensor.
- Remove the bolt -1- from the wheel roller bearing case.
- Remove the ABS speed sensor from the wheel bearing housing.

For easier viewing, the brake disc is represented as removed.



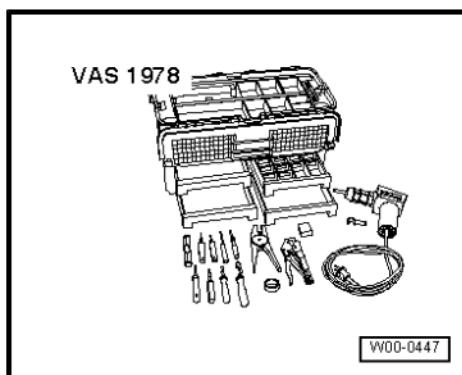
11.2.2 Installation

- Before installing the speed sensor, clean the internal hole surface and coat with Lubricating putty - G 052 142 A2- or G 052 112 A3 - Lubricating putty- around the sensor. Refer to the ⇒ Chemicals Manual .
- Place the speed sensor in the wheel bearing housing and tighten the bolt to 8 Nm.
- Connect the speed sensor to the speed sensor cable.
- Turn the steering wheel completely to the left and to the right and control the space available for the speed sensor cable.

11.3 Bosch 5.7 front speed sensor cables - remove and install

Special tools and workshop equipment required

- ◆ Harness repair set - VAS 1978-

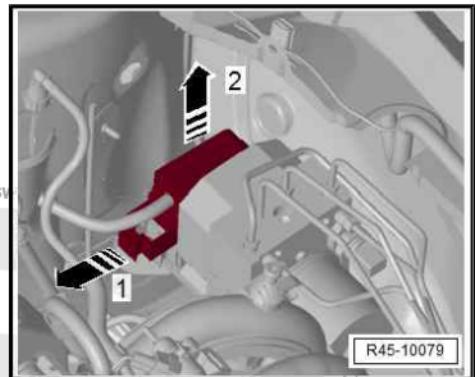


11.3.1 Removal

- Note the coding in vehicles with code radio equipment, request such coding if necessary.
- Disconnect the battery ⇒ Electrical system; Rep. gr. 27 ; Starter, alternator, battery .

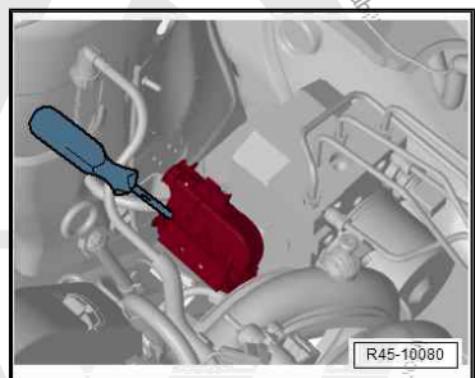


- Unlock and disconnect command unit -arrow 1- and pull it -arrow 2-.



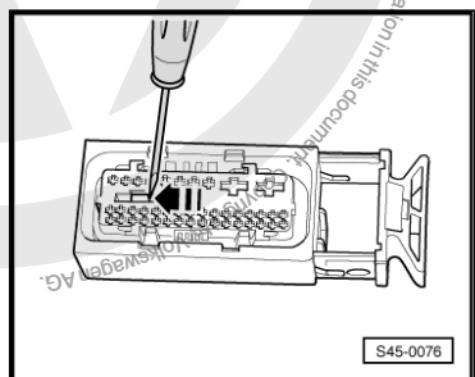
R45-10079

- Release the multiple connector cover cap with a screwdriver and remove it.



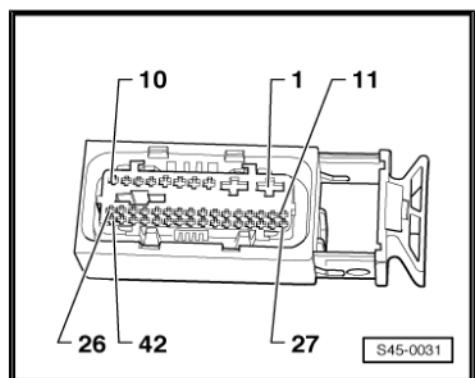
R45-10080

- Unlock the secondary lock (purple) with a small screwdriver in the arrow direction.



S45-0076

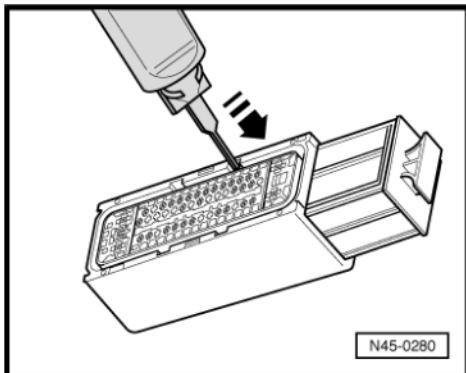
Contact assignment for connector -T42- ABS control unit - J104-
 ⇒ Electrical diagrams, diagnosis of electrical faults and installation locations .



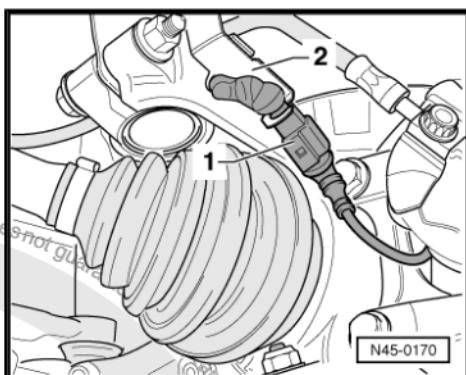
S45-0031



- With an extractor from the Harness repair set - VAS 1978- , pull out the respective contacts.
- Disconnect the connector from the speed sensor cable as well as the speed sensor.



- Also disconnect the connector -1- in vehicles with the brake pad wear indicator.
- Disengage the support cable -2-.
- Remove the speed sensor cable.



11.3.2 Installation

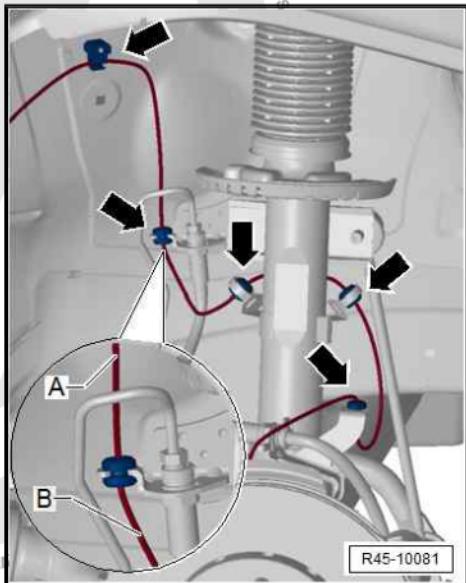
- Connect the speed sensor to the speed sensor cable.
- Fasten the speed sensor cable in the locations indicated by the -arrows-.



WARNING

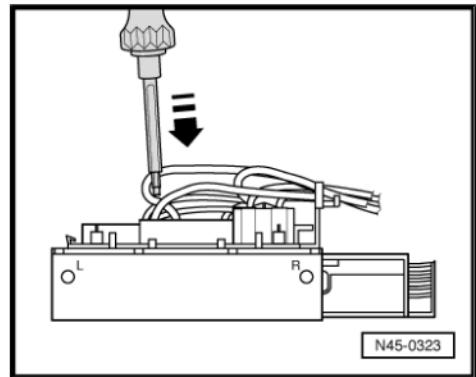
- Ensure that the speed sensor cable at point -A- passes behind the hydraulic brake lines and that the same at point -B- passes in front of the hydraulic brake line.

- Place the brake pad wear indicator connector on the suspension support.
- Connect the connectors.





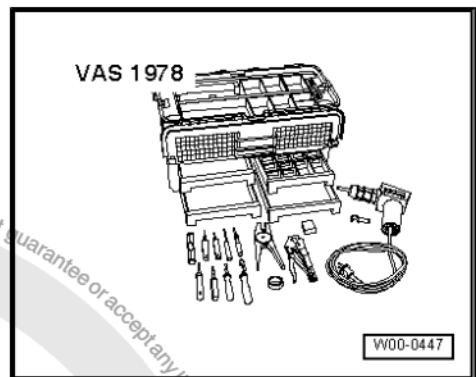
- Push to the stop the individual cable insulation with the assembly tool from the Harness repair set - VAS 1978- .
- Lock the contacts with the secondary lock and place the multiple connector cover cap.



11.4 Bosch 8.0 / 8.2 front speed sensor cables - remove and install

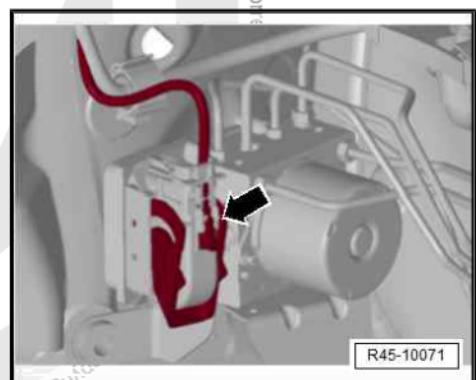
Special tools and workshop equipment required

- ◆ Harness repair set - VAS 1978-



11.4.1 Removal

- Observe coding on vehicles equipped with code radio. If necessary, request coding.
- Disconnect the battery ⇒ Electrical system; Rep. gr. 27 ; Starter, alternator, battery .
- Unlock the connector for ABS control unit - J104- pushing the -arrow-.

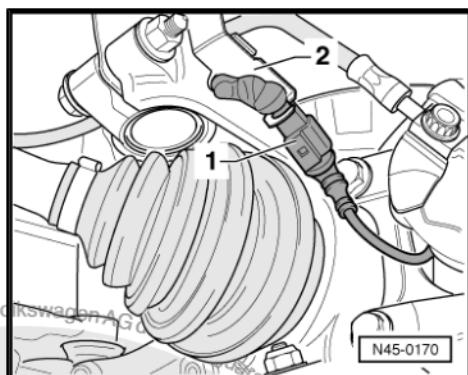
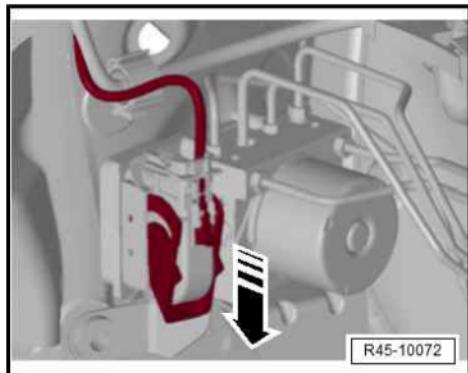




- Release the connector for ABS control unit - J104- -arrow- and remove it by pulling it forward.
- Release the multiple connector cover cap with a screwdriver and remove it.

Contact assignment for the 38-pin connector - T38- / ABS control unit - J104- ⇒ Electrical diagrams, diagnosis of electrical faults and installation locations

- With an extractor from the Harness repair set - VAS 1978- , pull out the respective contacts.
- Disconnect the connector from the speed sensor cable as well as the speed sensor.
- Also disconnect the connector -1- in vehicles with the brake pad wear indicator.
- Disengage the support cable -2-.
- Remove the speed sensor cable.



11.4.2 Installation

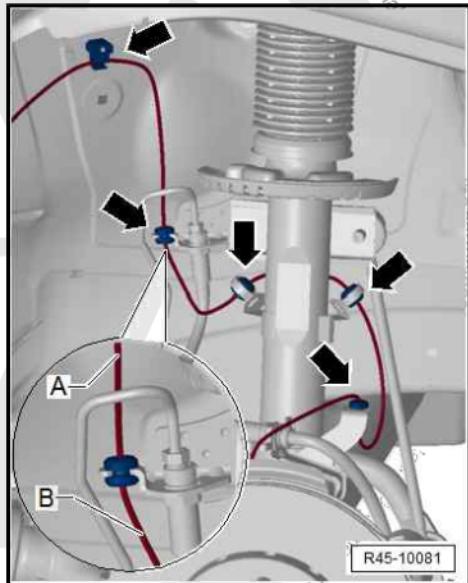
- Connect the speed sensor to the speed sensor cable.
- Fasten the speed sensor cable in the locations indicated by the -arrows-.



WARNING

- Ensure that the speed sensor cable at point -A- passes behind the hydraulic brake lines and that the same at point -B- passes in front of the hydraulic brake line.

- Place the brake pad wear indicator connector on the suspension support.
- Connect the connectors.
- Lock the contacts with the secondary lock and place the multiple connector cover cap.



11.5 ABS system components on rear axle (vehicles with drum brakes) - remove and install

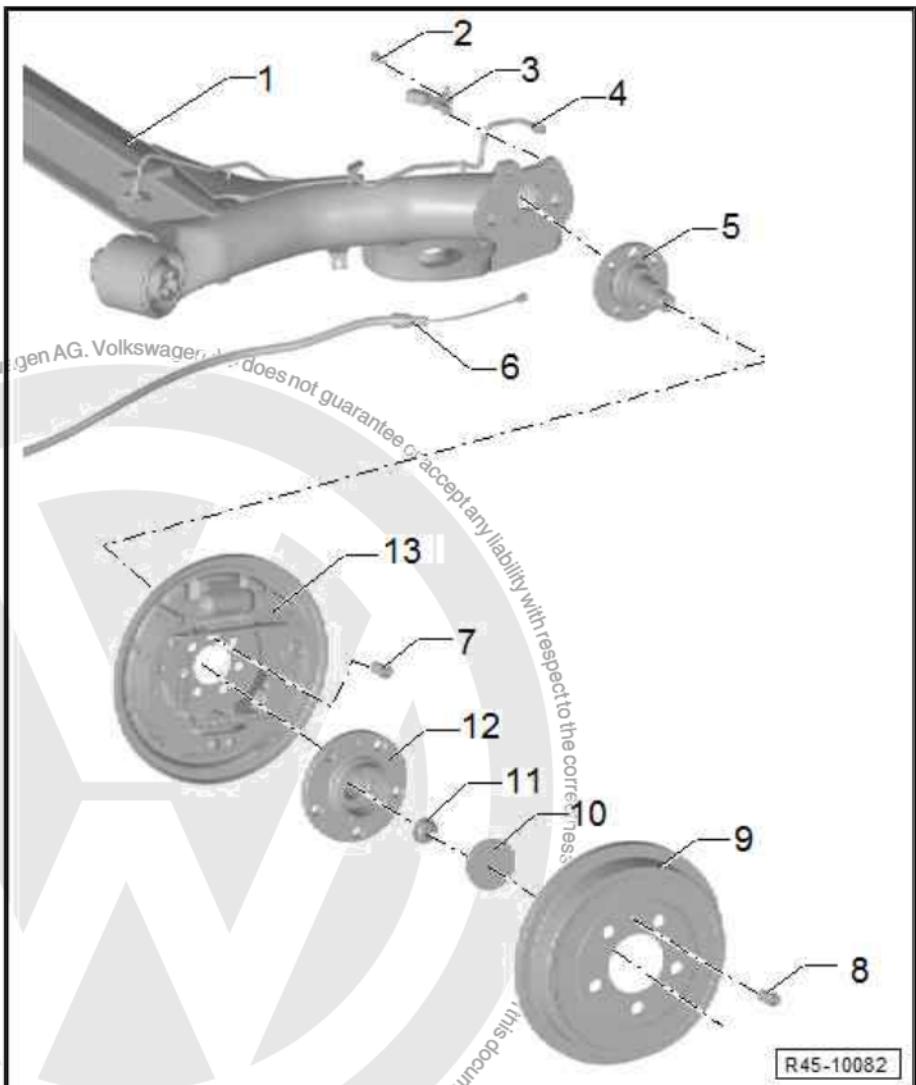


WARNING

Always replace self-locking nuts and bolts subject to angular torque



- 1 - Axle beam
- 2 - Internal hex head bolt
 - 8 Nm
- 3 - ABS speed sensor
 - is checked through self-diagnosis
 - before putting the sensor, clean the internal hole surface and coat with lubricating putty - G 052 142 A2- or G 052 112 A3 - lubricating putty- around the sensor. Refer to the Chemicals Manual .
- 4 - Brake tube
- 5 - Shaft end
- 6 - Handbrake cable
- 7 - Hexagonal head bolt
 - with dish spring
- 8 - Bolt
- 9 - Brake drum
 - Brake drum diameter, 200 mm.
 - Wear limit 201.5 mm.
 - Release the handbrake before removing the brake drum.
 - clean thoroughly and check for wear, damage, dimensional precision and braking surface with no apparent damages.
- 10 - Cover
- 11 - Self-locking grooved nut
 - Replace whenever removed
- 12 - Wheel hub with wheel roller bearing and rotor
 - always replace completely.
 - remove and install ➤ Running gear, axles, steering; Rep. gr. 42 ; Rear suspension .
- 13 - Calliper body with brake shoes
 - Release the handbrake before removing the brake drum.



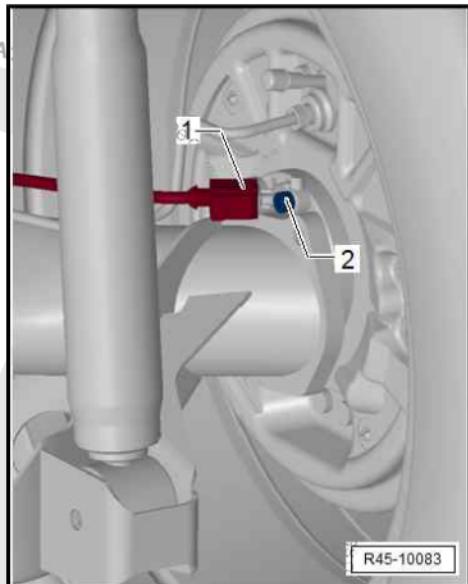
11.6 Speed sensor on rear axle (drum brake) - remove and install

11.6.1 Removal

- Jack the vehicle.



- Disengage connector -1- from the speed sensor.
- Loosen the bolt -2- from the shaft end.
- Disconnect speed sensor from the shaft end.



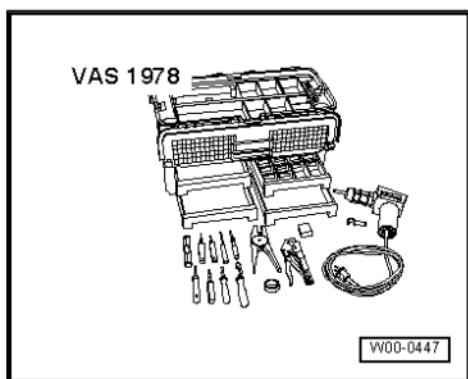
11.6.2 Installation

- Before installing the speed sensor, clean the internal hole surface and coat with Lubricating putty - G 052 142 A2- or G 052 112 A3 - Lubricating putty- around the sensor. Refer to the ⇒ Chemicals Manual .
- Place the speed sensor in the shaft end hole and tighten the bolt to 8 Nm.
- Remove the speed sensor cable.

11.7 Rear speed sensor cables - remove and install

Special tools and workshop equipment required

- ◆ Harness repair set - VAS 1978-

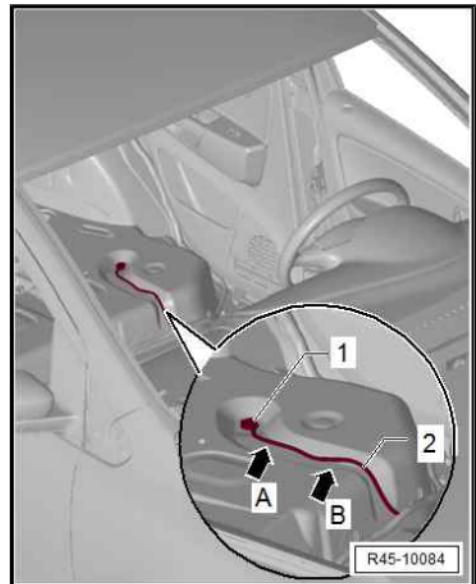


11.7.1 Removal

- Observe coding on vehicles equipped with code radio. If necessary, request coding.
- Disconnect the battery ⇒ Electrical system; Rep. gr. 27 ; Starter, alternator, battery .
- Disconnect the connector from the speed sensor cable as well as the speed sensor.
- Remove the back door sill lining.
- Pull back the carpeting around the seat area ⇒ Body - General body assembly work, interior; Rep. gr. 70 ; Linings/insulations .



- Remove the rubber boot -1- and pull the speed sensor cable -2- inside the internal compartment.
- Cut the speed sensor cable between -arrows- -A- and -B- using the insulating pliers from the Harness repair set - VAS 1978- and remove the defective section -2- of cable.

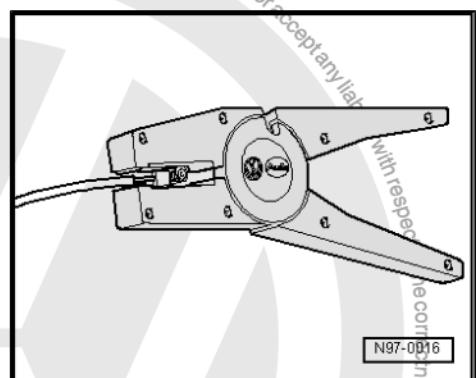


R45-10084

11.7.2 Installation

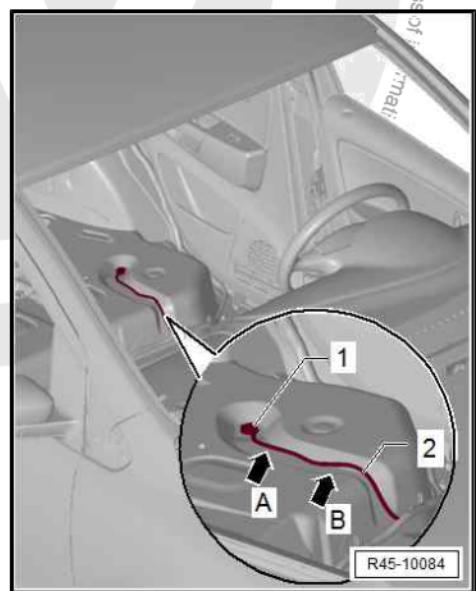
- Insert the new speed sensor cable.
- Strip 15 mm of the cable tip with the insulating pliers and turn the stripped cable halfway.
- Connect the speed sensor cable using a cable fastener from the Harness repair set - VAS 1978- .
- Connect the speed sensor to its corresponding cable connector.

When installing the speed sensor cable, make sure it is not twisted in the wheel housing.



N97-0016

- Fasten the rubber boot -1-.
- Put the carpet in the seat area again.
- Install the rear door sill lining → General body repairs, interior; Rep. gr. 70 ; Lining / insulation .



R45-10084



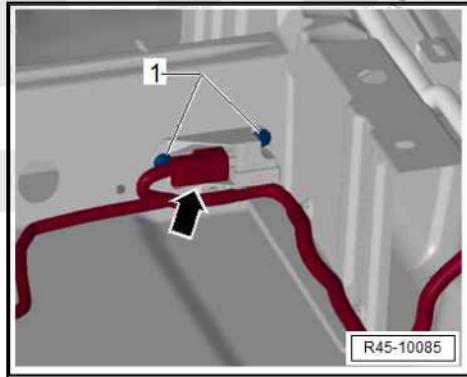
12 ESP system components - remove and install

12.1 Lateral tilting intensity sensor - G202- and Lateral acceleration sensor - G200- - remove and install

Lateral tilting intensity sensor - G202- and Lateral acceleration sensor - G200- are packed in a case and are located on the seat cross member under the carpet.

12.1.1 Removal

- Remove the left seat ⇒ General body repairs, interior; Rep. gr. 72 ; Seat framework .
- Remove the left door sill lining ⇒ General body repairs, interior; Rep. gr. 70 ; Lining / insulation .
- Pull away the floor carpet until Lateral tilting intensity sensor - G202- and Lateral acceleration sensor - G200- become free.
- Disconnect the connector for Lateral tilting intensity sensor - G202- and Lateral acceleration sensor - G200- .
- Loosen the two fastening nuts -1- .
- Remove Lateral tilting intensity sensor - G202- and Lateral acceleration sensor - G200- .



12.1.2 Installation



WARNING

Very strong vibrations may damage the Lateral tilting intensity sensor - G202- and the Lateral acceleration sensor - G200- .

- Installation is performed in the reverse sequence of the removal.

When installing Lateral tilting intensity sensor - G202- and Lateral acceleration sensor - G200- , correct, effortless seating on the fittings must be guaranteed.

Under no circumstances may the Lateral tilting intensity sensor - G202- and Lateral acceleration sensor - G200- be force-fitted by means of the fastening nuts.

Tightening torques:	
Fastening nuts for the Lateral tilting intensity sensor - G202- and Lateral acceleration sensor - G200-	6 Nm



12.2 Steering angle sensor - G85- - remove and install

The steering angle sensor is installed between the steering wheel and the steering column switch.

12.2.1 Removal

- Position the wheels in a straight angle.
- Remove the airbag unit, if fitted, and the steering wheel. ⇒ Running gear, axles, steering; Rep. gr. 48 ; Steering wheel .
- Remove the Steering wheel angle sensor - G85- .

12.2.2 Installation

- Install Steering angle sensor - G85- and carry out the basic adjustment.
- Carry out basic adjustment with the Vehicle diagnostic, testing and information system - VAS 5051A /52- in the "Assisted troubleshooting"function.
- Connect the Vehicle diagnostic, testing and information system - VAS 5051A/52- and advance until the "Function/component selection" is displayed.



46 – Brakes - mechanism

- 1 Front wheel brake - repair
- 1.1 Front brake - Brake caliper FS II - assembly overview

 Note

- ◆ After replacing the brake pads, press the brake pedal repeatedly for their correct seating
- ◆ To draw the braking fluid from its reservoir, always use the Brake filling and bleeding equipment - VAS 5234- or the Accessory set for bleeder - V.A.G 1869/4- .
- ◆ Before removing the brake caliper or pulling out a brake caliper hose, always install the Brake pedal pressing device - VAG 1869/2- .
- ◆ Tightening torques for the wheel bolts ⇒ Chassis; Rep. gr. 44 ; Wheels, tyres, vehicle dimensions

Protected by copyright. Copying for private or internal purposes, in part or in whole, is not permitted.



1 - Brake disc

- Brake disc thickness: 18 mm.
- Wear limit: 16 mm.

or

Brake discs with visual check system, refer to [page 62](#).

2 - Bolt

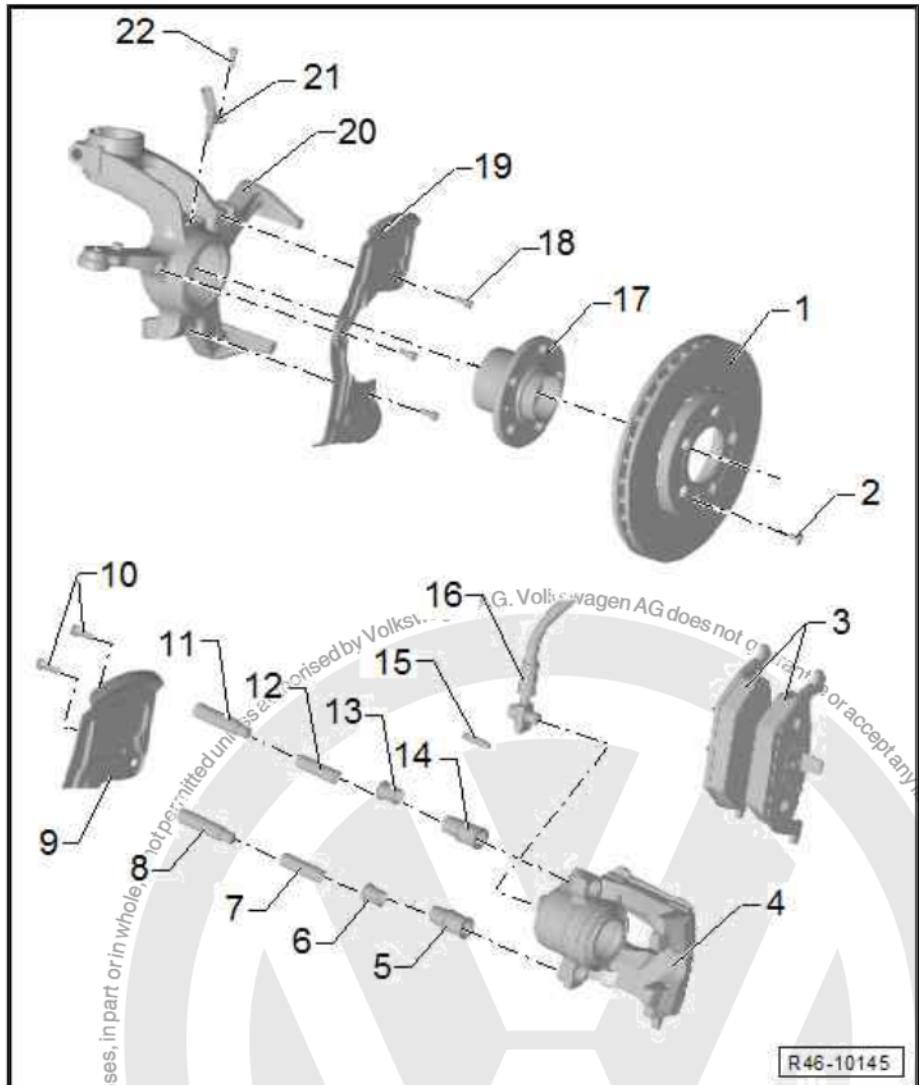
- 8 Nm.

3 - Brake pads

- with wear indication
- when the corresponding wear is reached (limit: 2 to 3 mm), a control light turns on in the dash panel.
- Thickness 12 mm, the pad with largest packing area is installed on the outside.
- Wear limit: 7 mm with the rear plate.
- Check thickness
⇒ Maintenance ; Booklet ; .
- always replace from the same axle.
- remove and install
[page 50](#).

4 - Brake caliper

- repair [page 104](#).
- remove and install





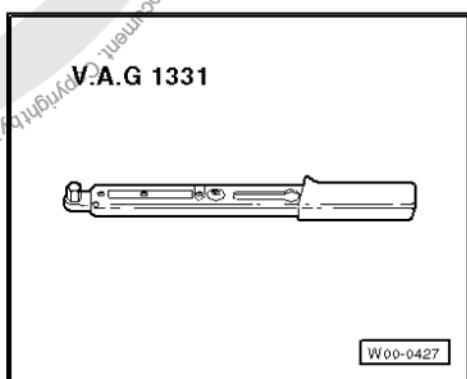
[⇒ page 52 .](#)

- 5 - Lower sleeve
- 6 - Lower bushing
- 7 - Lower spacer sleeve
- 8 - Lower internal hex head bolt
 - 23 Nm
- 9 - Air duct
- 10 - Hexagonal head bolt
 - 10 Nm
- 11 - Internal hex head bolt
 - 23 Nm
 - The upper bolt is longer than the lower bolt
- 12 - Upper spacer sleeve
- 13 - Upper bushing
- 14 - Upper sleeve
- 15 - Fastening sleeve
- 16 - Brake hose with annular nozzle and hollow bolt
 - 35 Nm
- 17 - Wheel hub
 - remove and install ⇒ Running gear, axles, steering; Rep. gr. 40 ; Front suspension .
 - knocking: 0.04 (vehicles without abs)
 - knocking: 0.02 (vehicles with abs)
- 18 - Hexagonal head bolt
 - 12 Nm.
- 19 - Cover plate
- 20 - Wheel roller bearing case
- 21 - ABS speed sensor
 - before putting the sensor, clean the internal hole surface and coat with lubricating putty - G 052 142 A2- or G 052 112 A3 - lubricating putty- around the sensor. Refer to the ⇒ Chemicals Manual .
- 22 - Internal hex head bolt
 - 8 Nm.

1.2 Brake pads - remove and install

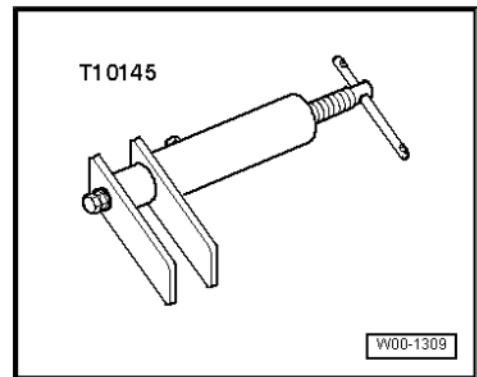
Special tools and workshop equipment required

- ◆ Torque wrench - 5 to 50Nm (1/2" drive) - VAG 1331-





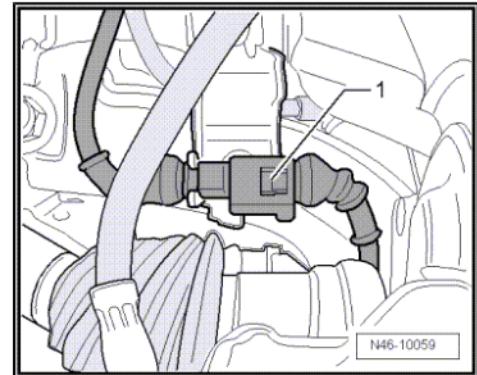
- ◆ Piston resetting tool - T 10145-



- ◆ Plunger re-fitter device

1.2.1 Removal

- Remove the wheels.
- For vehicles with brake pad wear indicator, disconnect the connector -1-.
- Remove the cover caps.

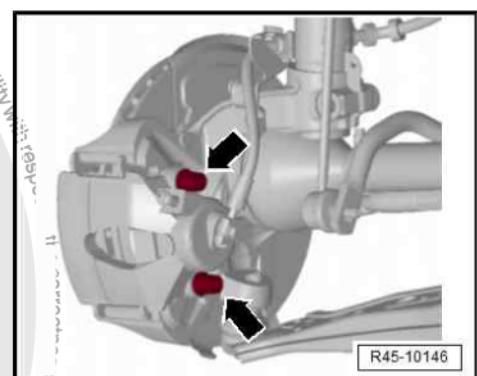


- Loosen the two bolts -arrows- of the brake caliper and remove them.
- Remove the brake cylinder and fasten it with wire so that the brake caliper weight does not stress and damage the brake flexible tube.
- Remove the brake pads.



Note

For cleaning the brake cylinder you must only use alcohol.

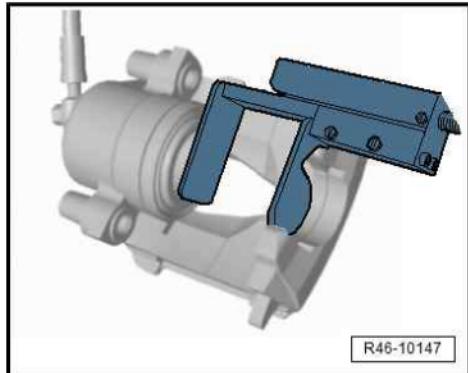


1.2.2 Installation

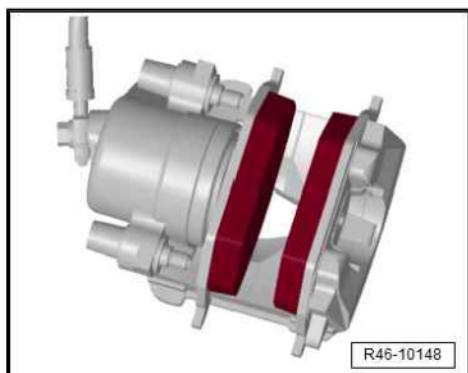
Before installing new brake pads, press the plungers in the cylinder with the re-fitter device. Before pressing the plungers, collect the reservoir brake fluid in a container. Otherwise, if brake fluid recirculates during this interval it may leak and cause damage.



- Reposition the plungers.
- Install the brake pads.



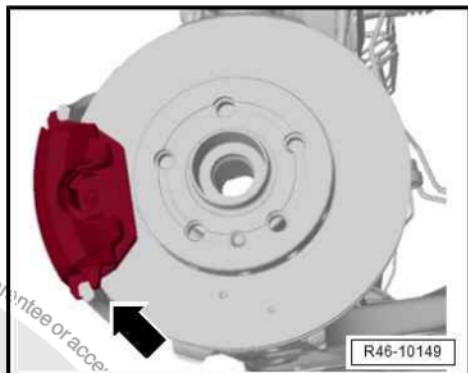
- The larger brake pad is installed on the outside.



- Assemble the brake caliper by placing its lower section first -arrow-.
- The brake caliper tear must be positioned behind the brake support guide.
- Thread the bolt into the wheel bearing housing and tighten to 23 Nm .
- In vehicles with brake pad wear indicator, fit the connector of the wear indicator.
- Install the wheels.

Note

- ◆ After replacing each brake pad, press the brake pedal repeatedly and strongly with the vehicle stopped so that the brake pads are perfectly seated for operation.
- ◆ After replacing the brake pads, check the brake fluid level.

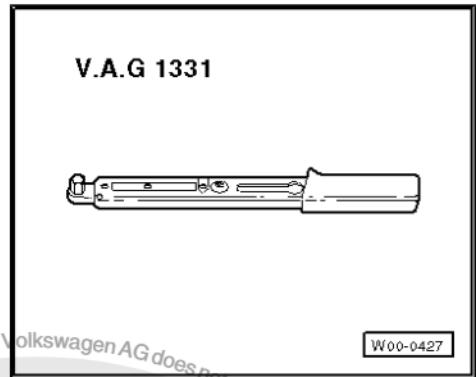


1.3 FS II brake caliper - remove and install

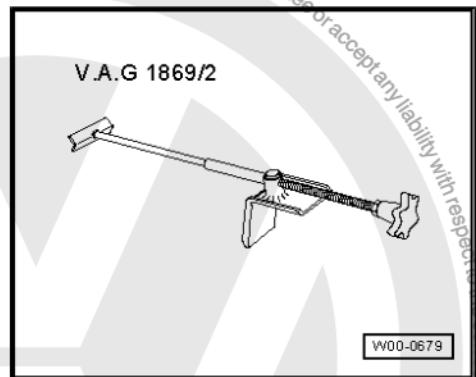
Special tools and workshop equipment required



- ◆ Torque wrench - 5 to 50Nm (1/2" drive) - VAG 1331-



- ◆ Brake pedal pressing device - VAG 1869/2



1.3.1 Removal

The following sequence is related only to brake caliper replacement or repair tasks:

Remove the wheels.

Disconnect the brake pad wear indicator connector.

Insert a flexible tube in the caliper bleeder valve, and then open it.

Install the Brake pedal pressing device - VAG 1869/2- .

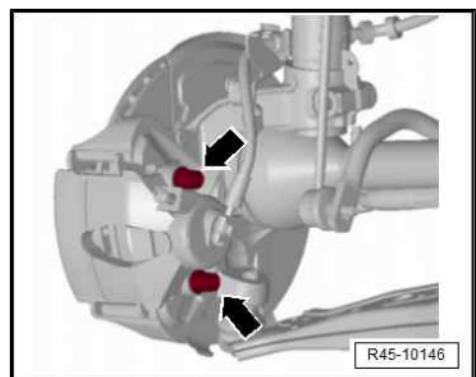
Close the bleeder valve and remove the bleeder container.

Remove the brake flexible tube.

Remove securing bolts -arrows- from the brake caliper.

Remove the caliper from the brake support.

Remove the brake pads from the brake caliper.

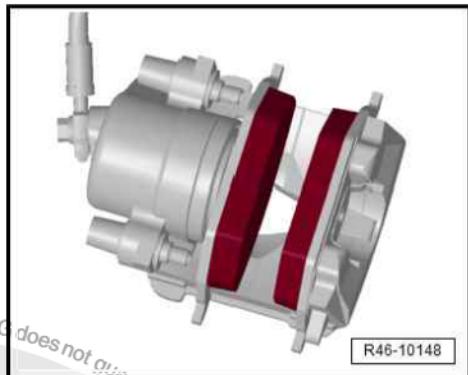


1.3.2 Installation

- The plunger should be retracted:
 - Install the pads in the caliper cup and install the plunger.



Pads with larger dimensions are seated on the outside.



- Assemble the brake caliper by placing its lower section first -arrow-.
- The brake caliper tear must be positioned behind the brake support guide.
- Install the flexible hose to the brake caliper with 35 Nm of torque.
- Remove Brake pedal pressing device - VAG 1869/2- .
- In vehicles with brake pad wear indicator, fit the connector of the wear indicator.

- Tighten bolts -arrows- with 23 Nm of torque.

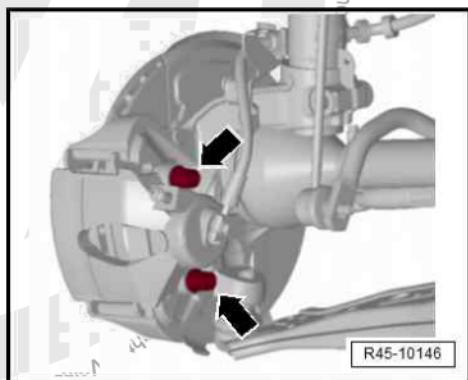
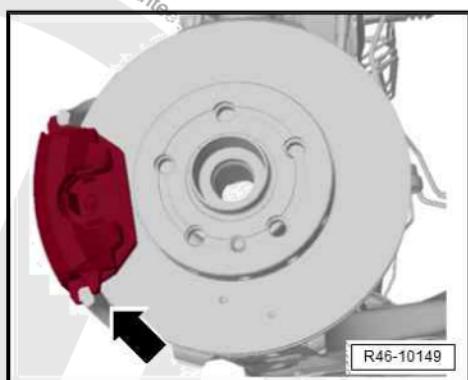
Note

The bolt with the smaller dimension should be mounted onto the lower brake caliper section.

- Bleed the brake system.

Install the wheels.

For tightening torques, refer to: ⇒ Chassis, axles, steering; Rep. gr. 44 ; Vehicle wheels, tires, vehicle measurement .



Note

- ◆ *Rapidly and vigorously press the brake pedal so that the pads seat properly according to their normal operating condition.*
- ◆ *Check the brake fluid level and replenish if necessary.*



1.4 Front wheel brake - FS II brake caliper - repair



Note

- ◆ After replacing the brake pads, press the brake pedal repeatedly for their correct seating
- ◆ To draw the braking fluid from its reservoir, always use Brake filling and bleeding equipment - VAS 5234- or the Accessory set for bleeder - V.A.G 1869/4-
- ◆ Before removing the brake caliper or pulling out a brake caliper hose, always install the Brake pedal pressing device - VAG 1869/2-

1 - Brake disc

- vented, Ø 256 mm.
- Thickness 22 mm.
- Wear limit: 19 mm.

or

on brake discs with visual check system, refer to
[⇒ page 62](#).

2 - Bolt

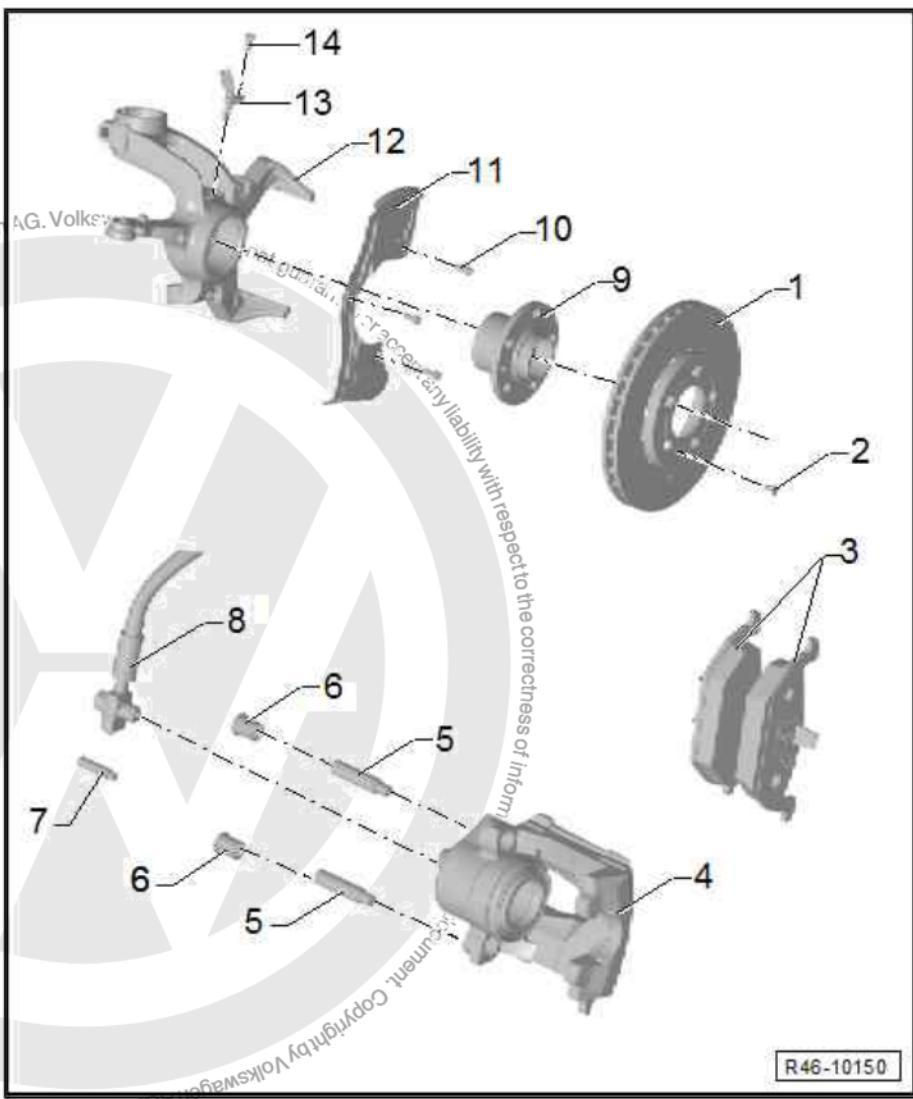
- 8 Nm.

3 - Brake pads

- with wear indication.
- when the corresponding wear is reached (limit: approx. 4 mm) a control light turns on in the dash panel.
- Thickness: 14 mm.
- Wear limit: 7 mm with the rear plate.
- Check thickness
 ⇒ Maintenance ; Booklet ; .
- always replace from the same axle.
- remove and install
[⇒ page 56](#).

4 - Brake caliper

- for brake pad replacement, do not remove the





brake flexible tube.

- repair [page 107](#) .
- remove and install [page 58](#) .

5 - Guide pin

- 30 Nm.

6 - Cover cap

7 - Fastening sleeve

8 - Brake hose with annular nozzle and hollow bolt

- 35 Nm.

9 - Wheel hub

- extract and press ⇒ Running gear, axles, steering; Rep. gr. 40 ; Front suspension .
- knocking: 0.04 (vehicles without abs)
- knocking: 0.02 (vehicles with abs)

10 - Hexagonal head bolt

- 12 Nm.

11 - Cover plate

12 - Wheel roller bearing case

13 - ABS speed sensor

- before putting the sensor, clean the internal hole surface and coat with lubricating putty - G 052 142 A2- or G 052 112 A3 - lubricating putty- around the sensor. Refer to the ⇒ Chemicals Manual .

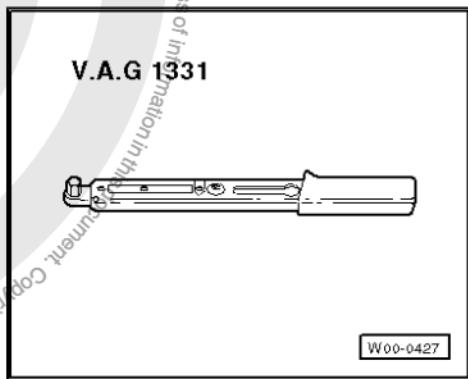
14 - Internal hex head bolt

- 8 Nm

1.5 Brake pads, FS III disc brake cylinder - remove and install

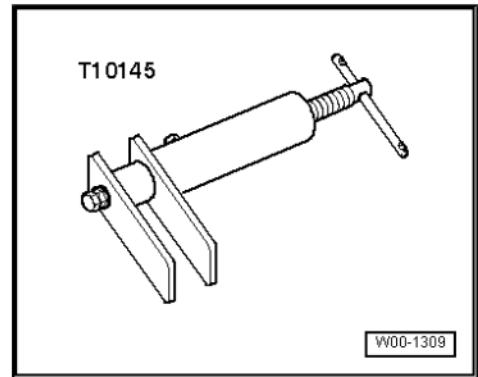
Special tools and workshop equipment required

- ◆ Torque wrench - 5 to 50Nm (1/2" drive) - VAG 1331-





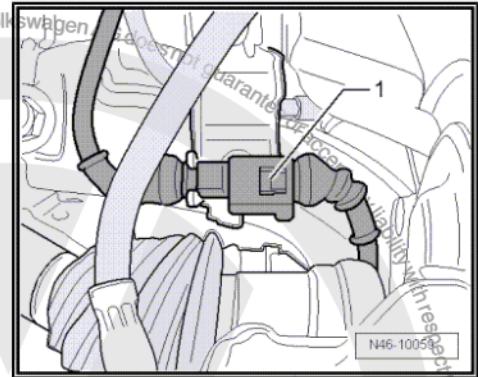
- ◆ Piston resetting tool - T 10145-



VW00-1309

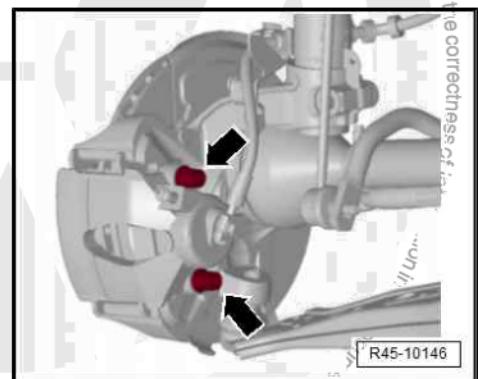
1.5.1 Removal

- Remove the wheels.
- For vehicles with brake pad wear indicator, disconnect the connector -1-.
- Remove the cover caps.



- Loosen the guide pins -arrows- of the brake caliper and remove them.
- Remove the brake cylinder and fasten it with wire so that the brake caliper weight does not stress and damage the brake flexible tube.
- Remove the pads from the brake cylinder.

For cleaning the brake caliper case, use alcohol only.

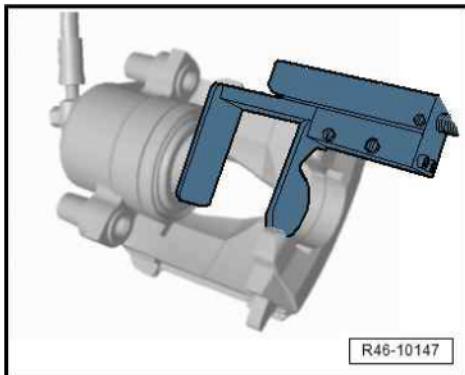


1.5.2 Installation

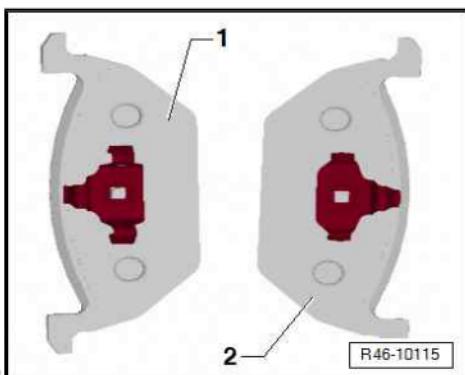
Before installing new brake pads, press the plungers in the cylinder with the re-fitter device. Before pressing the plungers, collect the reservoir brake fluid in a container. Otherwise, if brake fluid recirculates during this interval it may leak and cause damage.



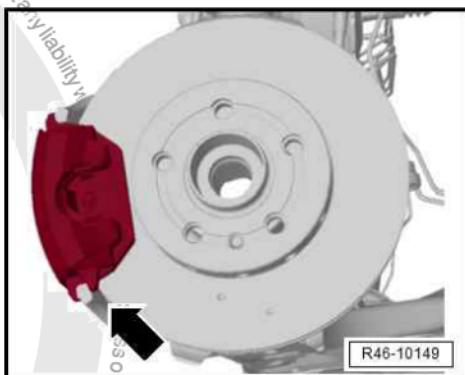
- Press the plungers back.
- Place the pads in the brake caliper housing.



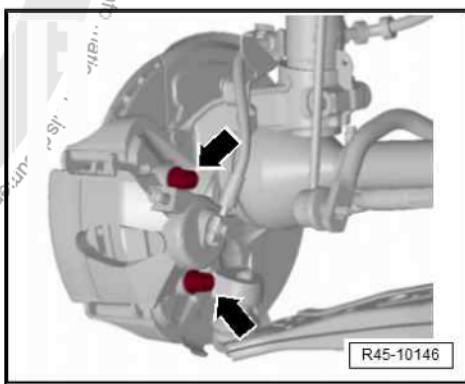
- Pad -1- should be mounted on the plunger, and Pad -2- should be mounted on the housing.



- Assemble the brake caliper by placing its lower section first -arrow-.
- The brake caliper tear must be positioned behind the brake support guide.



- Install guide pins -arrows- on the brake caliper and fasten them to 30 Nm of torque [Item 5 \(page 56\)](#).
- In vehicles with brake pad wear indicator, fit the connector of the wear indicator.
- Install the wheels
- ◆ After replacing each brake pad, press the brake pedal repeatedly and strongly with the vehicle stopped so that the brake pads are perfectly seated for operation.
- ◆ After replacing the brake pads, check the brake fluid level.

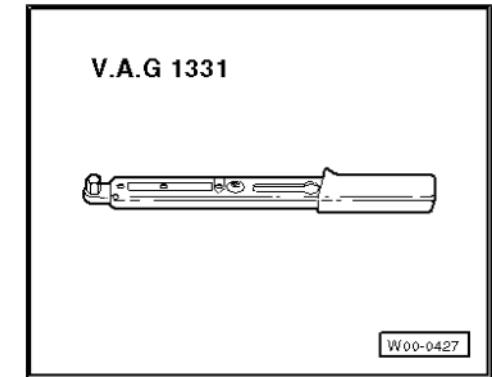


1.6 FS III brake caliper - remove and install

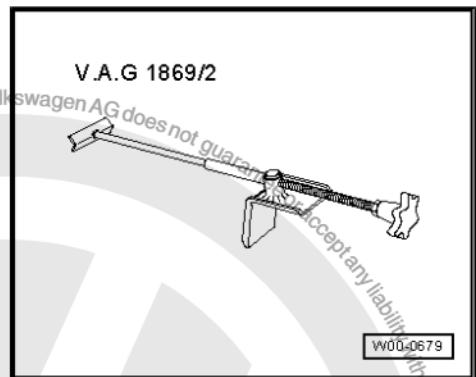
Special tools and workshop equipment required



- ◆ Torque wrench - V.A.G 1331-



- ◆ Brake pedal actuator - V.A.G 1869/2-



1.6.1 Removal

The following sequence is related only to brake caliper replacement or repair tasks.

Remove the wheels.

In vehicles with brake pad wear indicator, fit the connector of the wear indicator.

Insert a flexible tube in the caliper bleeder valve, and then open it.

Install the Brake pedal actuator - V.A.G 1869/2- .

Close the bleeder valve and remove the bleeder container.

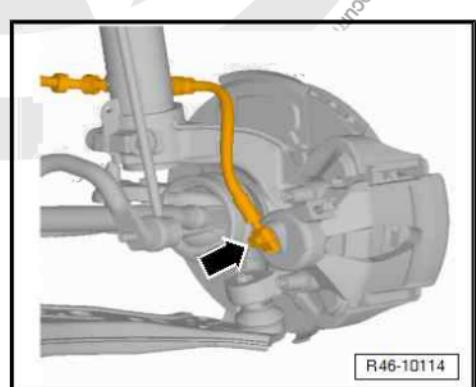
Remove the brake flexible tube -arrow-.

Remove both guide pin covers.

Remove the brake caliper guide pins.

Remove the caliper from the brake support.

Remove the brake pads from the brake caliper.



1.6.2 Installation

- The plunger should be retracted:
- Install the pads in the caliper body



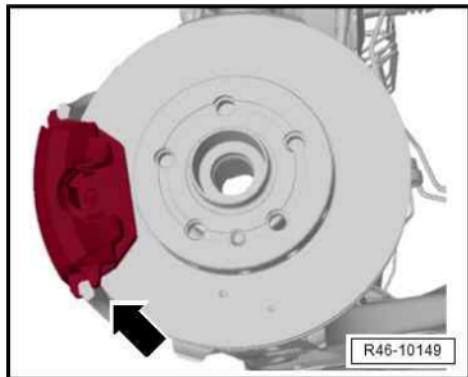
- Assemble the brake caliper by placing its lower section first -arrow.
- The brake caliper tear must be positioned behind the brake support guide.
- Install the flexible hose to the brake caliper with 35 Nm of torque.
- Install guide pins arrows on the brake caliper and fasten them to 30 Nm of torque .
- Remove the Brake pedal actuator - V.A.G 1869/2- .
- In vehicles with brake pad wear indicator, fit the connector of the wear indicator.
- Mount the guide pin covers.
- Bleed the brake system [⇒ page 114](#) .

Install the wheels.

For tightening torques, refer to: ⇒ Chassis, axles, steering; Rep. gr. 44 ; Vehicle wheels, tires, vehicle measurement .

Note

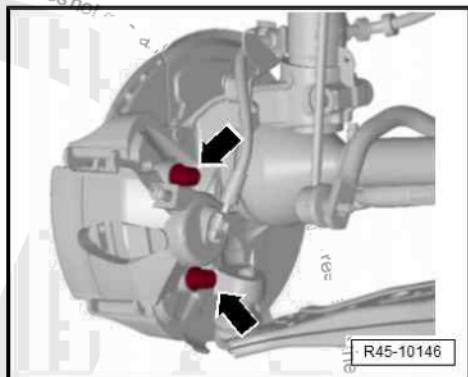
- ◆ *Rapidly and vigorously press the brake pedal so that the pads seat properly according to their normal operating condition.*
- ◆ *Check the brake fluid level.*



1.7 Brake disc - remove and install

1.7.1 Removal

- For vehicles with brake pad wear indicator, disconnect the connector of the wear indicator.
- Loosen the two guide pins -arrows- from the brake caliper and pull them out.
- Remove the brake cylinder and fasten it with wire so that the brake caliper weight does not stress and damage the brake flexible tube.



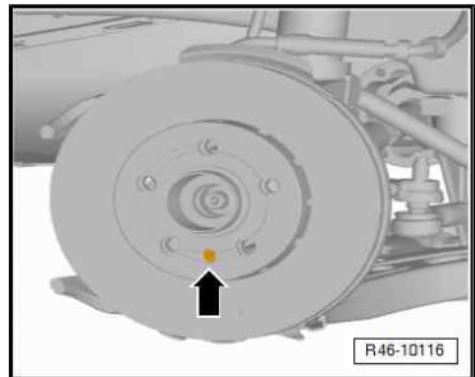


- Remove the bolt fastening the brake disc to wheel hub -arrow-, and remove the disc.



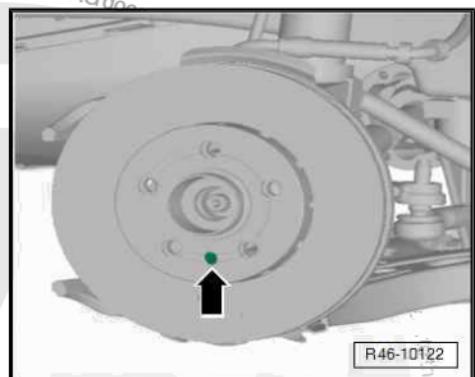
Note

- ◆ *Do not remove the brake discs from the wheel hub with excessive force, use a rust remover if necessary, otherwise the discs may be damaged.*
- ◆ *Always replace both discs of the same axle.*

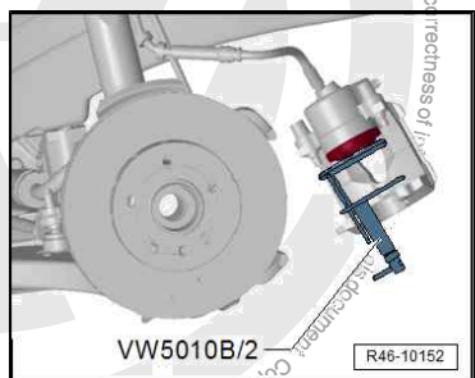


1.7.2 Installation

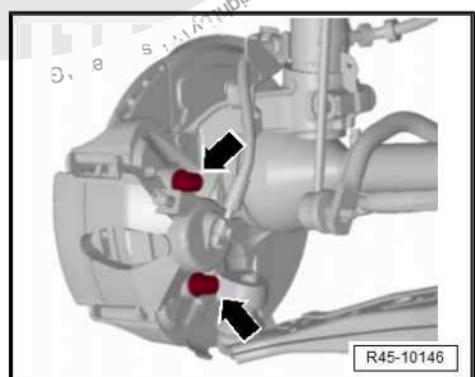
- Install the brake disc, fastening the bolt -arrow- to the torque of 8 Nm.



- Return plunger to resting position.
- Install the pads properly in the caliper.



- Install the brake caliper, fastening the guide pins -arrows- to 30 Nm of torque.



1.8 Brake disc - check (disc knocking)

- Remove brake disc [page 60](#).
- Clean the wheel hub surface properly.
- Check for clearance in the hub with a dial gauge.



The dial gauge should be positioned 90° over the wheel hub surface, and in the indicated place -arrow-.

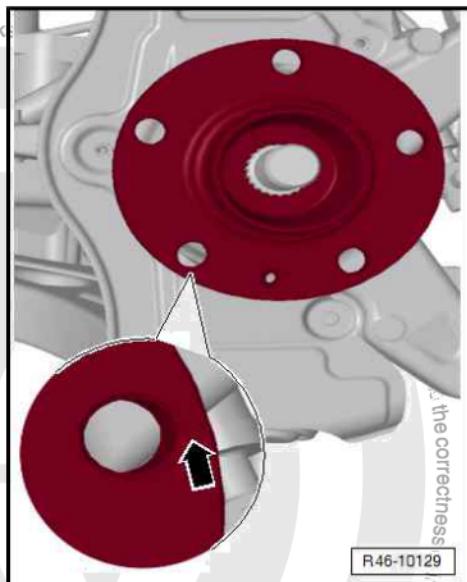
The value should be less than or equal to 0.04mm (for vehicles without abs)

The value should be less than or equal to 0.02mm (for vehicles with abs)

Otherwise, replace the wheel hub (for vehicles with abs).

Otherwise, replace the wheel hub (for vehicles with abs).

- If the wheel hub value is within the specified value, replace the discs.



1.9 Brake disc with visual check - check



Note

- ◆ The wear indicators on the front brake discs (visual check) indicate when the brake discs must be replaced. This check is made by using the marks found on the contact surface of the brake discs.
- ◆ Always check both discs on the same axle and, if necessary, replace them.

1.9.1 Vehicles with light-alloy wheels

Position the vehicle so that the brake disc wear indicators (visual check) can be seen.



Note

If the front brake disc wear indicator markings (visual check) cannot be visualized due to wheel design, the wheels must be removed.

Conditions for front brake disc wear checking:

1 - Wear indicators -1- and -2- are visible:

The brake discs need not be replaced.

2 - Only wear indicator -2- is visible:

The brake discs do not require replacement, but be aware that the next replacement is close.

3 - No wear indicator is visible on the brake disc.

Replace the brake discs.

Remove and install the front brake discs.

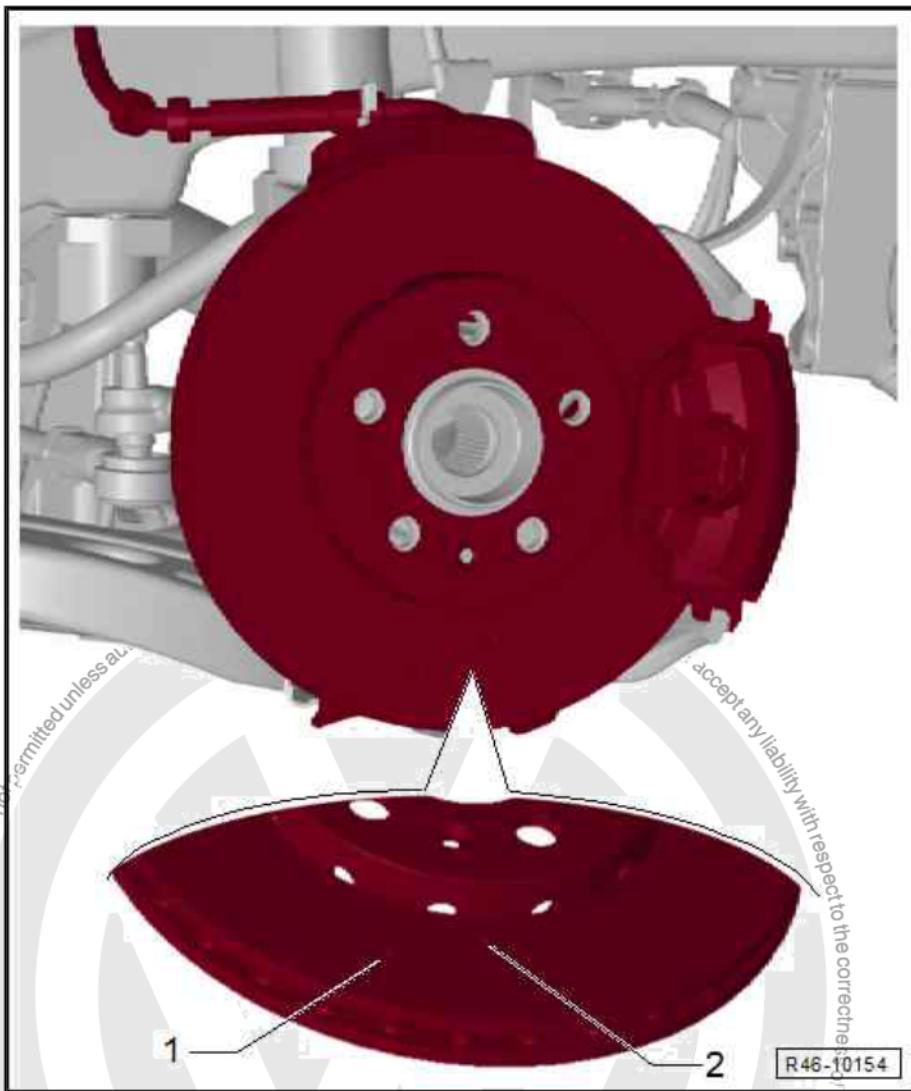
Protected by copyright. Copying or commercial use in part or in whole is not permitted unless explicitly allowed by law.



1.9.2 Vehicles with steel wheel



In order to see the brake disc wear indicators (visual check) on vehicles with steel wheels, the front wheels must be removed.



Conditions for front brake disc wear checking:

1 - Wear indicators -1- and -2- are visible:

The brake discs need not be replaced.

2 - Only wear indicator -2- is visible:

The brake discs do not require replacement, but be aware that the replacement is close.

3 - No wear indicator is visible on the brake disc

Replace the brake discs.

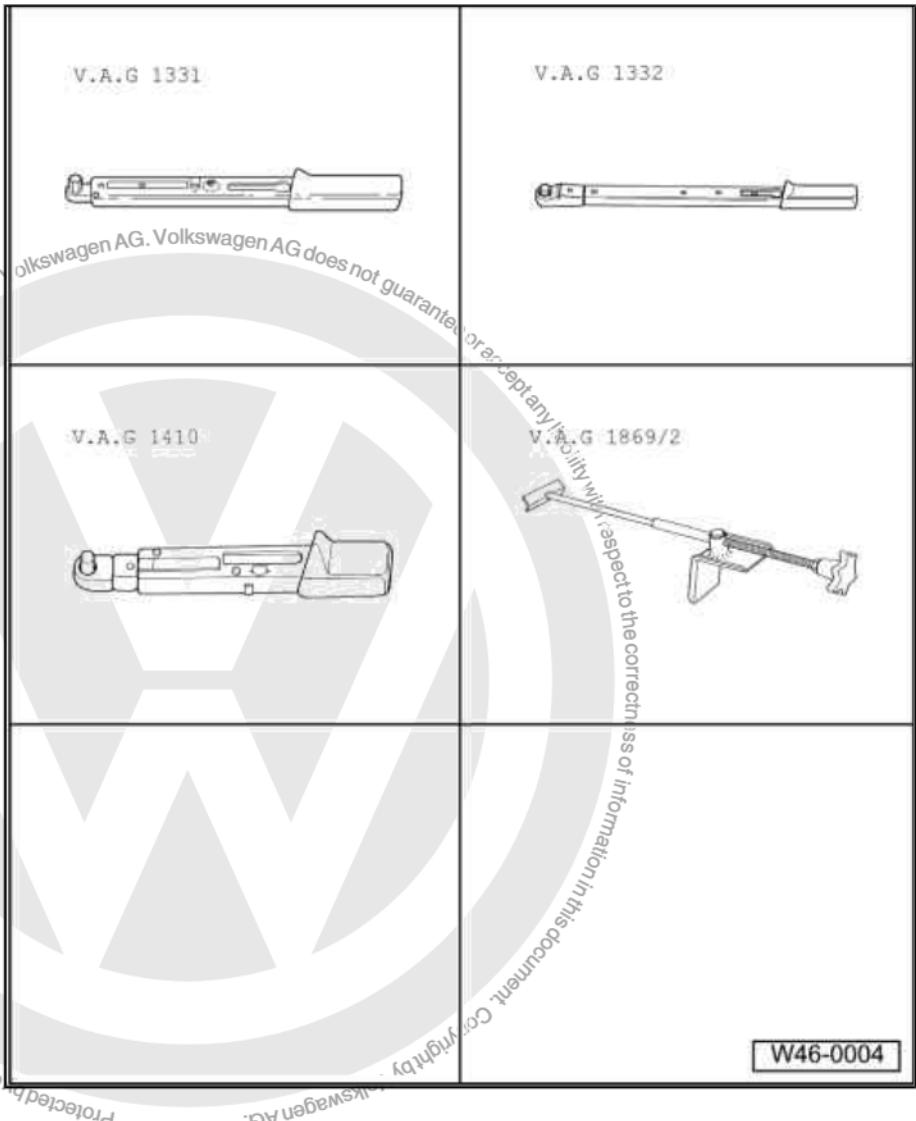
Remove and install the front brake discs.



2 Rear wheel brake (drum brake) - repair

2.1 Rear wheel brake - assembly overview

Special tools and workshop equipment required



- ◆ Torque wrench - 5 to 50Nm (1/2" drive) - VAG 1331-
- ◆ "Torque wrench - 40 to 200Nm (1/2" drive) - VAG 1332-
- ◆ Torque wrench - 4 to 20Nm (3/8" drive) - VAG 1410-
- ◆ Brake pedal pressing device - VAG 1869/2-



Note

- ◆ After replacing the wheel brake cylinder, the brake support and the brake shoe, it is absolutely necessary to strongly press the brake pedal once so that the brake shoes are properly seated.
- ◆ To draw the braking fluid from its reservoir, always use the Brake filling and bleeding equipment - VAS 5234- or the Accessory set for bleeder - V.A.G 1869/4- .
- ◆ Before removing a cylinder or brake support and before disconnecting a brake cylinder tube, the Brake pedal pressing device - VAG 1869/2- must be installed.



WARNING

Always replace self-locking nuts and bolts subject to angular torque.

asda

- 1 - Axle beam
2 - Internal hex head bolt
 8 Nm

3 - ABS speed sensor

- before putting the sensor, clean the internal hole surface and coat with lubricating putty - G 052 142 A2- or G 052 112 A3 - lubricating putty- around the sensor. Refer to the ⇒ Chemicals Manual .

4 - Brake tube

5 - Shaft end

6 - Handbrake cable

- adjust the handbrake [⇒ page 74](#) .
- remove and install [⇒ page 76](#) .

7 - Hexagonal head bolt

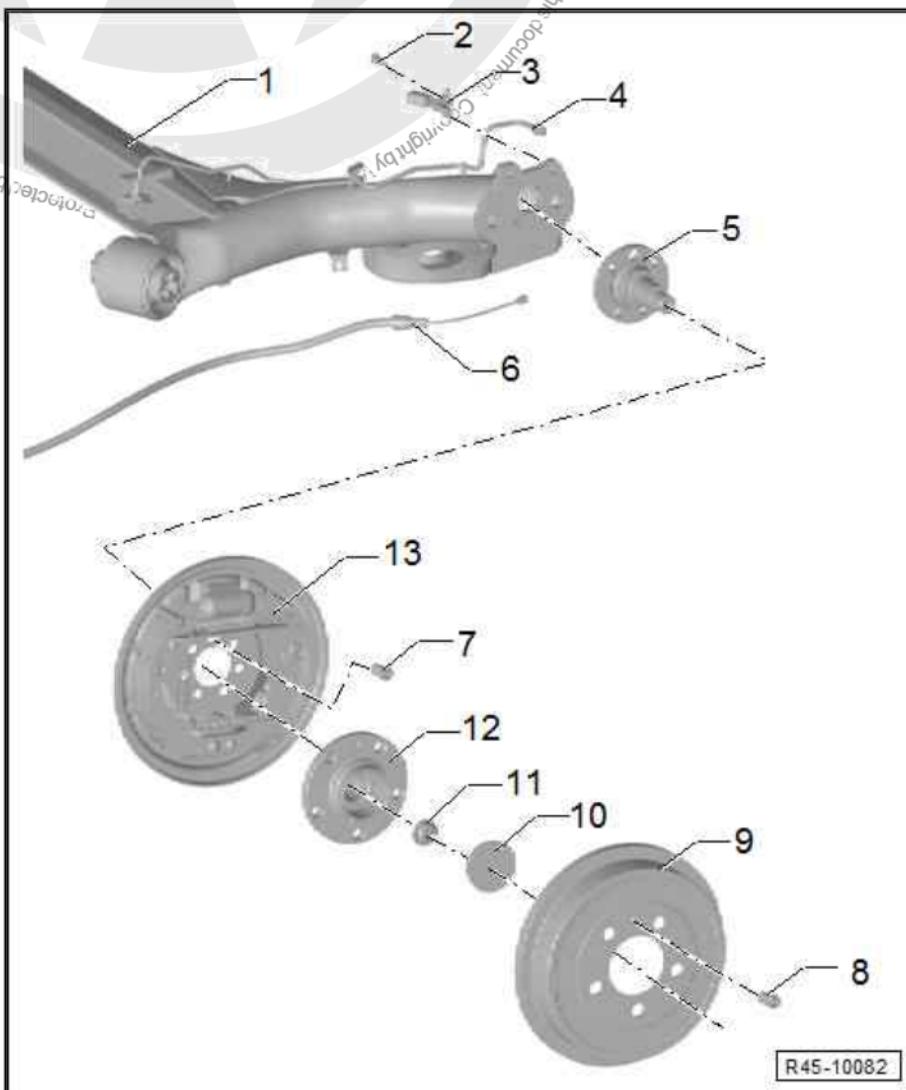
- 60 Nm.
- with spring dish.

8 - Bolt

- 8 Nm

9 - Brake drum

- Brake drum diameter, 200 mm.
- Wear limit 201.5 mm.
- clean thoroughly and check for wear, dam-





age, dimensional precision and braking surface with no impairments.

10 - Cover

- extract and insert ⇒ Running gear, axles, steering; Rep. gr. 42 ; Front suspension .

11 - Self-locking grooved nut

- Replace whenever removed
- 70 Nm + 30°.
- refer to ⇒ Chassis, axles, steering; Rep. gr. 42 ; Rear suspension .

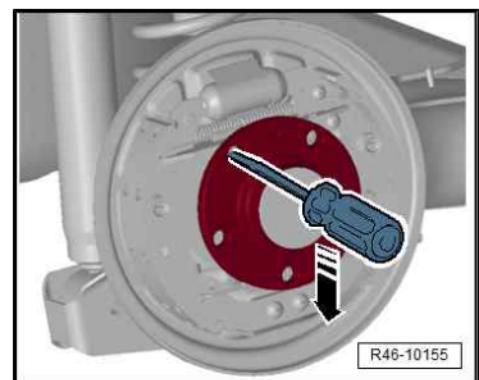
12 - Wheel hub with wheel roller bearing and rotor

- refer to ⇒ Chassis, axles, steering; Rep. gr. 42 ; Rear suspension .

13 - Calliper body with brake shoes

Reposition the brake

- Press the wedge upward through one of the threaded holes in the brake drum wheel bolts with a screwdriver.



2.2 Brake drum - repair

After working on the rear wheel brake:

- ◆ Release the handbrake.
- ◆ Strongly press the brake pedal once.

Protected by copyright. Copying or private use of commercial purposes, in part or in whole, is not permitted unless authorised by Volkswagen AG. Volkswagen AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright Volkswagen AG.



1 - Spring dish

- to remove, press against the compression spring and turn 90°

2 - Compression spring

3 - Brake shoe with handbrake lever

- remove and install
[⇒ page 70](#).
- adjust the handbrake
[⇒ page 74](#).

4 - Upper return spring

- disengage using Hook - 3438- .

5 - Lower return spring

- Lubricate the support points with grease number ET G 052 150 A2.

6 - Extension spring

7 - Brake shoe

- remove and install
[⇒ page 70](#)
- Minimum pad thickness 2.5 mm.
- Check the thickness ⇒ Maintenance with Accuracy .

The pads are also supplied without brake shoes.

8 - Sealing cap

- remove to check the brake shoe thickness.

9 - Spring pin

10 - Brake support

11 - Internal hex head bolt

- 8 Nm

12 - Wheel brake cylinder

- Check the sealing [⇒ page 69](#)

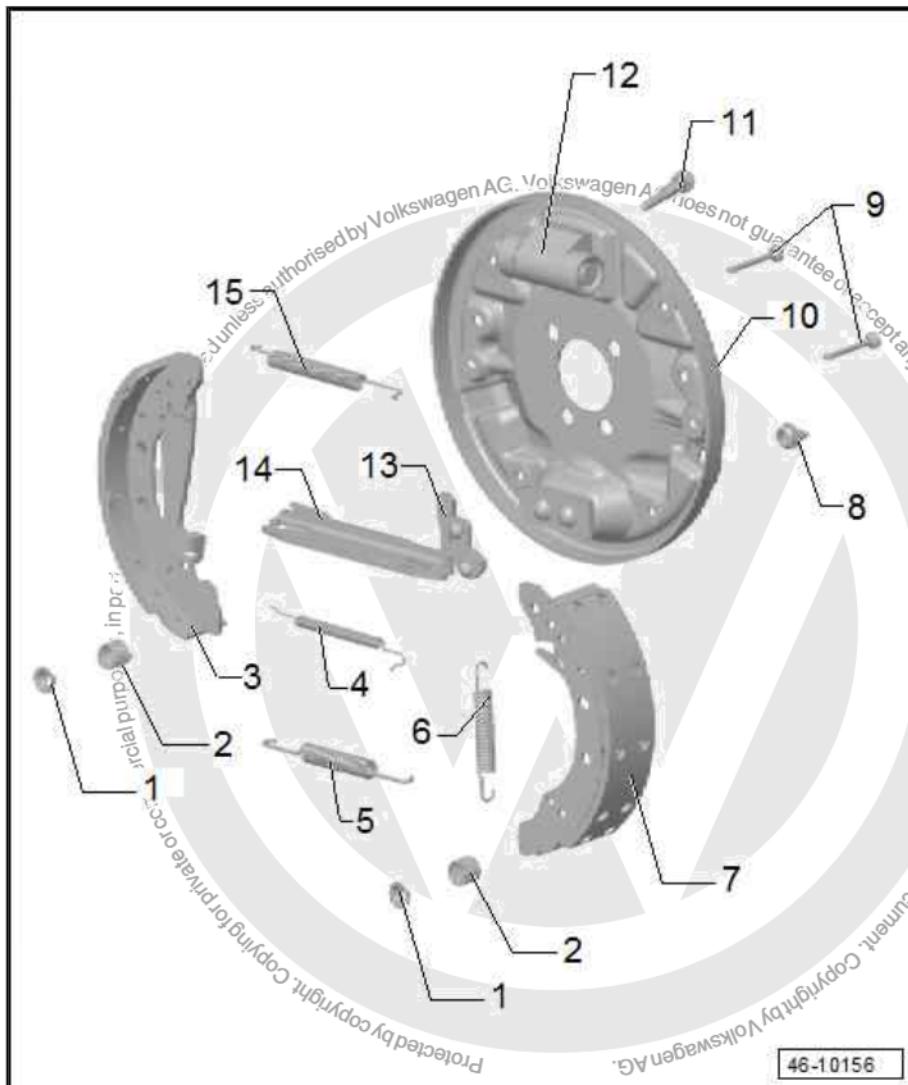
13 - Wedge

14 - Operating rod

- Lubricate the support points with grease number ET G 052 150 A2.

15 - Support spring

- disengage using Hook - 3438- .

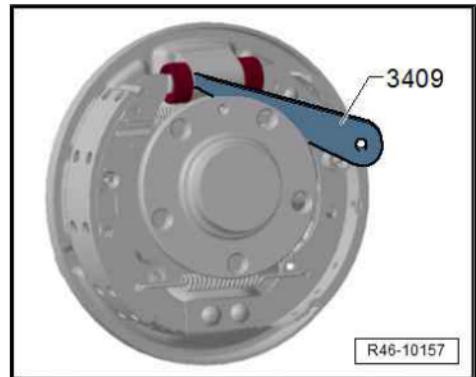




Check the tightness of the brake cylinder.

- Remove the sealing boot with the aid of Wedge - 3409- .
- If there is brake fluid in the dust protection boot, replace the brake cylinder.

While lifting the dust protection boot, make sure that it is not damaged.

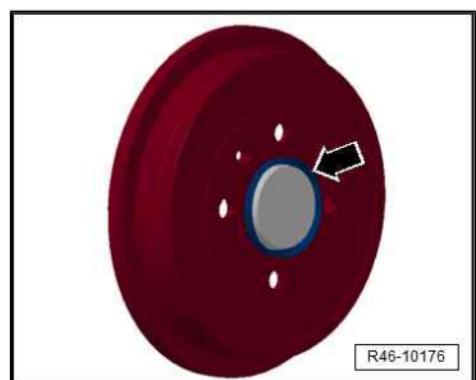


Apply Tectyl - AKR 329 060 BL- to the wheel hub joint and brake drum -arrow-.



WARNING

Tectyl must not be applied to the wheel holes, as this may affect the torque application of wheel bolts.



2.3 Brake drum - remove and install

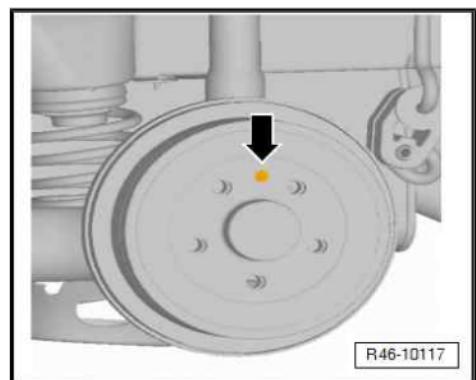
2.3.1 Removal

- Remove the wheel.
- Loosen the bolt -arrow- and remove the brake drum.



Note

To do this, the handbrake cannot be engaged.



2.3.2 Installation

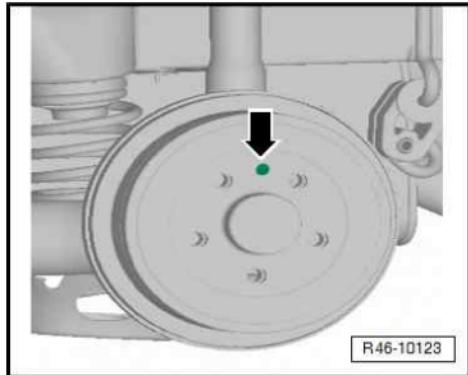
- Installation is carried out in the reverse order of removal.



- Install the brake drum, fastening the bolt -arrow- to the torque of 8 Nm.



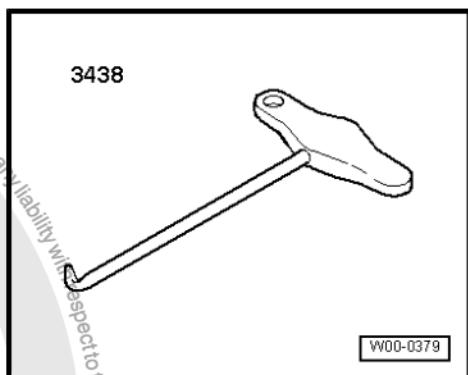
To assemble the brake drum, the handbrake cannot be engaged.



2.4 Brake shoes - remove and install

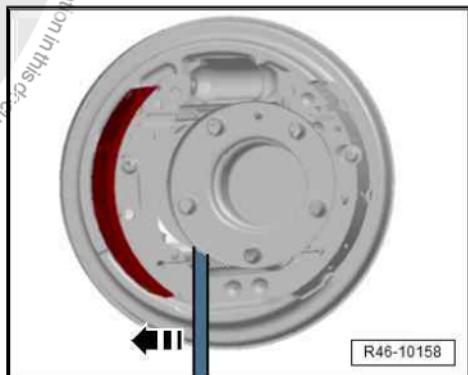
Special tools and workshop equipment required

- ◆ Hook - 3438-



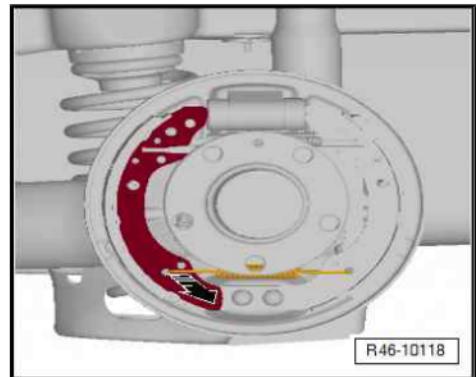
2.4.1 Removal

- Remove the wheels.
- Remove the brake drum. [⇒ page 69](#)
- Remove the spring dish with the compression springs.
- Uncouple the brake shoes in the arrow direction behind the lower support plate with the help of a screwdriver.
- Support the brake shoes on the lower support plate.



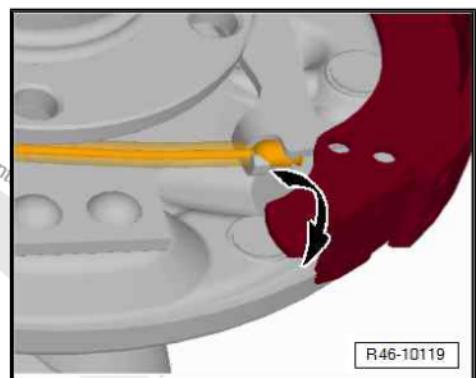


- Uncouple the lower return spring.



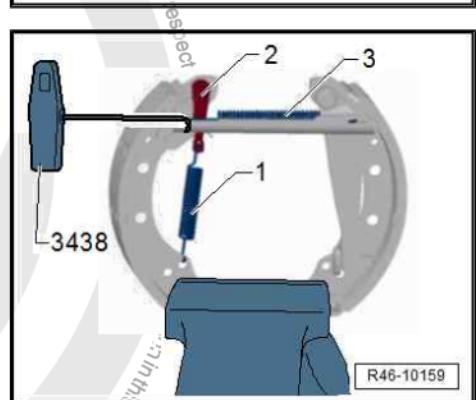
R46-10118

- Release the handbrake cable.
- Remove rear wheel brake cylinder [page 73](#).
- Remove the brake shoes between the wheel hub and the brake support.
- Fasten the brake shoes in a vise.



R46-10119

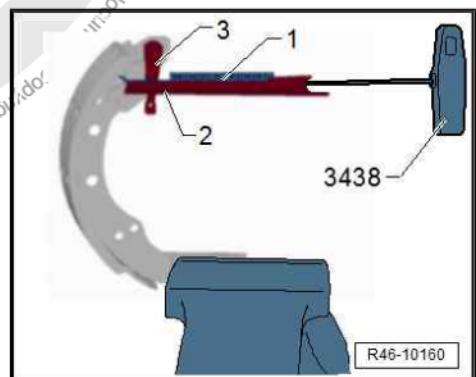
- Remove the drawspring -1- to the wedge -2-.
- Remove the upper return spring -3- with Hook - 3438- .



R46-10159

- Remove the return spring -1- with Hook - 3438- .
- Remove the operating rod -2- and the wedge -3- from the brake shoe.

Use only alcohol to clean the brake system.



R46-10160



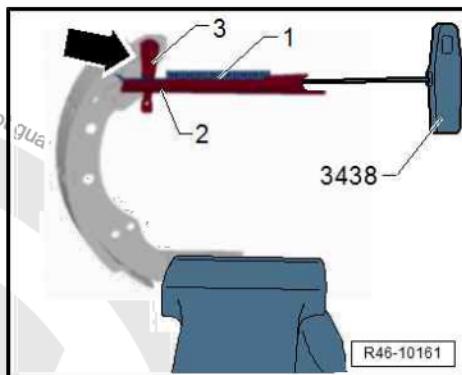
2.4.2 Installation

- Engage the support spring -1- with the Hook - 3438- on the operating rod -2-.
- Simultaneously place the wedge -3-.

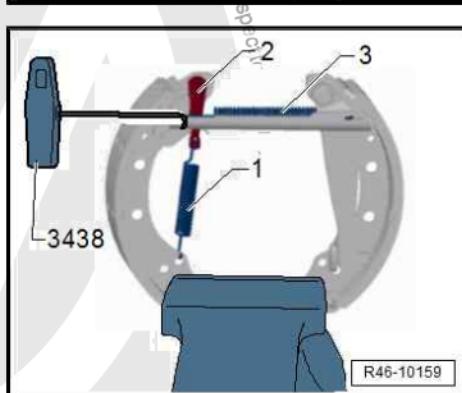
Assembly position:

The bump -arrow- must remain visible when installing.

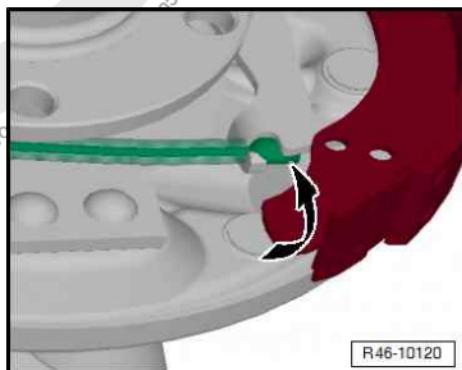
- Place the brake shoe with the lever on the operating rod.



- Fit return spring -3- with Hook - 3438- .
- Engage the drawspring -1- on the wedge -2-.
- Insert the brake shoes between the wheel hub and the brake support.
- Install rear wheel brake cylinder [⇒ page 73](#) .
- Place the shoes in the brake cylinder plunger.



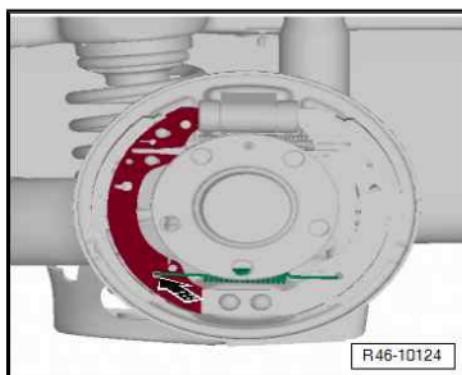
- Couple the handbrake cable to the brake lever.



- Place the lower return spring and couple the brake shoe behind the lower support.
- Press the compression spring with the spring dish.
- Install the brake drum [⇒ page 69](#) .
- Install the wheels.

For tightening torques, refer to: ⇒ Chassis, axles, steering; Rep. gr. 44 ; Vehicle wheels, tires, vehicle measurement .

- Strongly press the brake pedal once.
- Adjust the handbrake [⇒ page 74](#) .

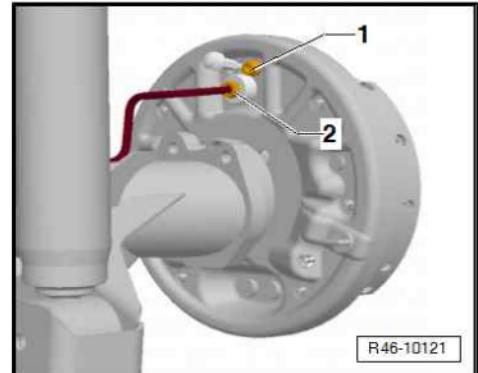




2.5 Rear wheel brake cylinder - remove and install

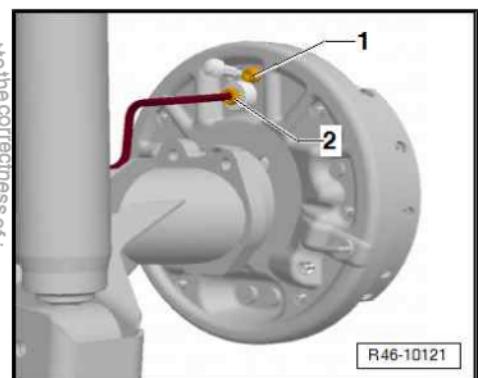
2.5.1 Removal

- Remove the brake drum [⇒ page 69](#).
- Remove the rear wheel brake cylinder, loosening the bolt -1- and hydraulic connection -2-.



2.5.2 Installation

- Install the rear wheel brake cylinder, fastening the bolt -1- to 8Nm of torque, and the hydraulic connection -2- with 14 Nm.





3 Handbrake - assembly overview

1 - Handbrake lever trim

- remove by pulling forward
- Uncouple the unlocking latch -arrow- in the lower cable area with a screwdriver.

2 - Compensation arch

3 - Adjusting nut

- Adjust the handbrake
[⇒ page 74](#).
- Vehicles with drum
brake

4 - Hexagonal nut

- 20 Nm + 90°.
- Replace whenever re-
moved.

6 - Right-hand guide tube

7 - Left-hand guide tube

8 - Handbrake lever support

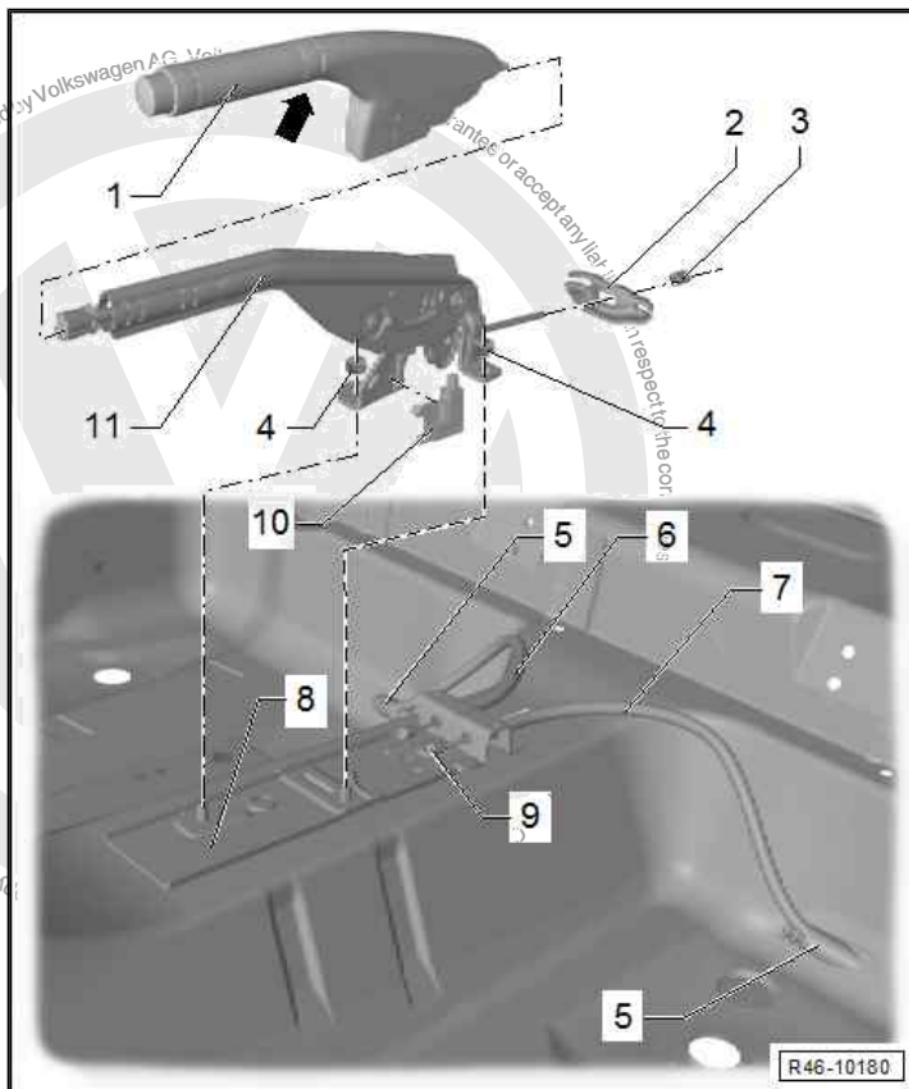
9 - Handbrake cables

- remove and install
(drum brake)
[⇒ page 76](#).

10 - Handbrake switch

- remove and install
[⇒ page 84](#).

11 - Handbrake lever



3.1 Handbrake cable - adjust

3.1.1 Adjustment

- Remove the handbrake finishing adjustment lid.



Note

To perform this operation, the brake must be in ideal conditions of functioning.

- Remove rear wheels.
- Loosen and remove the handbrake cables from the lever compensator.
- Raise the vehicle.
- Turn the brake drums until being able to see the wedges through the wheel securing holes.



- Raise the wedge to its maximum limit with a screwdriver.

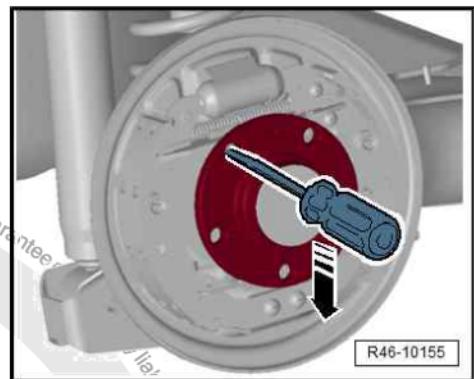


Note

- ◆ Be careful to not release the wedge drive spring.
- ◆ If the spring releases, the brake drum must be removed to re-install the spring.

- Turn the engine on, and accelerate once.
- Keep the engine in idle and press brake pedal three times, simulating an emergency braking.
- Turn engine off.
- Install the wheels.

For tightening torques, refer to: ⇒ Chassis, axles, steering; Rep. gr. 44 ; Vehicle wheels, tires, vehicle measurement .





- Assemble the cables and tighten the nut -arrow A- until it is no longer possible to turn the wheels manually.

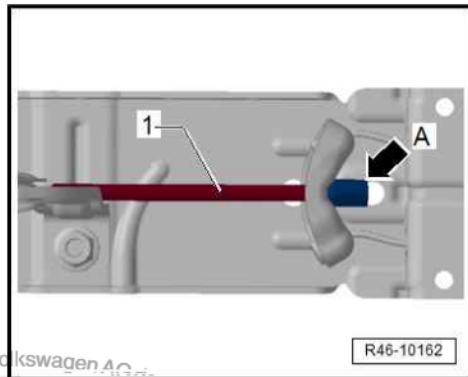
Note

To do this, the handbrake cannot be engaged.

- Loosen the nut -arrow A- until the wheel turns freely. A slight interference is allowed.

The adjusting nut -arrow A- should be screwed above the drawbar end -1-.

- Activate the brake lever and check if it is not possible to turn the wheels.



Note

With this procedure, the vehicle will be completely immobilized by activating the lever between the 3rd and 4th tooth.

- Release the handbrake and check that the wheels turn freely, otherwise slightly loosen the nut -arrow A-.
- With the lever button pressed, raise the lever to just before the stop for 10 times, keeping it in the position for 1 sec.
- Check the handbrake adjustment again.

In this condition, make sure that the wheel cannot move with the handbrake on the 4th tooth.

Otherwise, redo the adjustment until the wheel cannot move with the handbrake on the 4th tooth.

Note

A slight interference of the linings against the drum is allowed.

- Make a test-drive and check the wheels' temperature with your hands.

The difference of temperature must be significant between the front and rear wheels, and cannot be sensible from one side to another in the same axle.

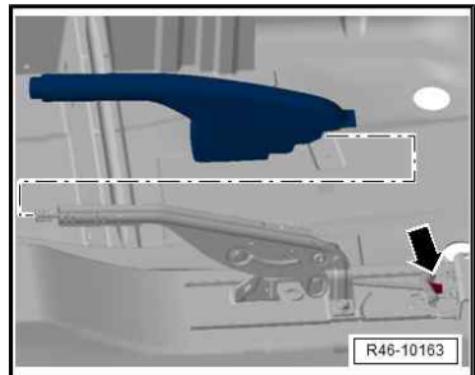
3.2 Handbrake cable (drum brake) - remove and install

3.2.1 Removal

- Remove the handbrake finishing adjustment lid.
- Release the handbrake.

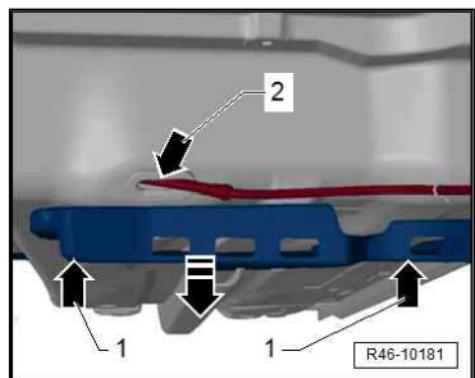


- Loosen the nut -arrow- until the handbrake cable can hang out of the compensator.
- Jack the vehicle.



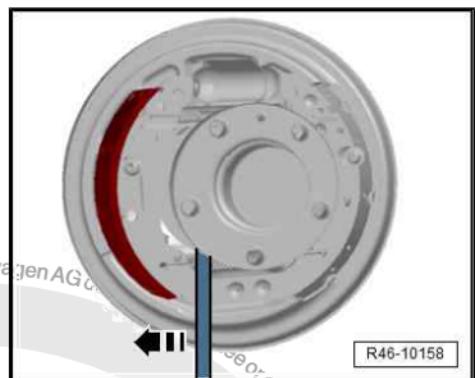
R46-10163

- Release nuts -1- and remove the floor protection to access the guide tube -2-.
- Remove the wheel.
- Remove the brake drum [⇒ page 69](#).
- Remove the spring dish with the compression springs.



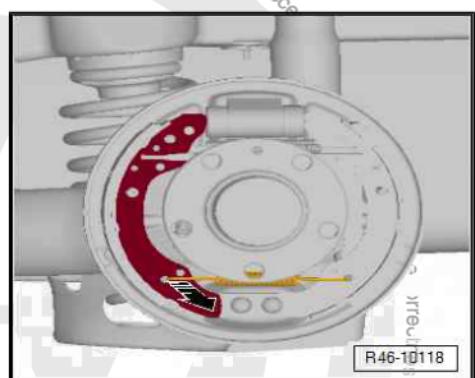
R46-10181

- Uncouple the brake shoes in the arrow direction behind the lower support plate with the help of a screwdriver.
- Support the brake shoes on the lower support plate.



R46-10158

- Uncouple the lower return spring.

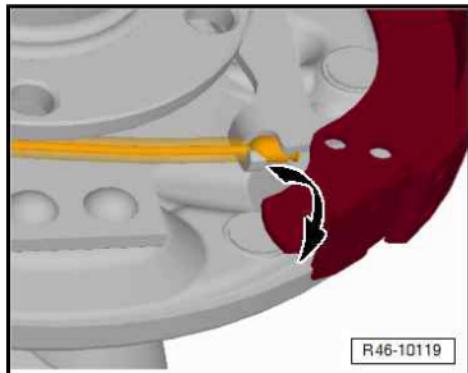


R46-10118

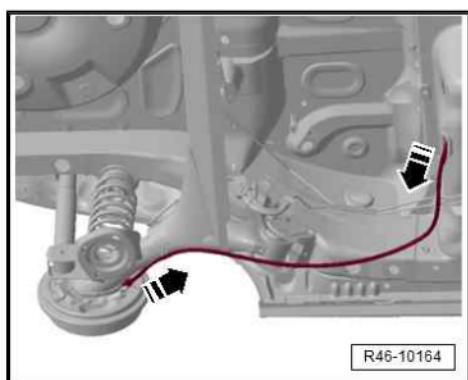
Protected by copyright. Copying or private use of whole or part of this document is not permitted unless authorised by Volkswagen AG. Volkswagen AG reserves all rights. Use of information in this document is at the sole risk of the user.



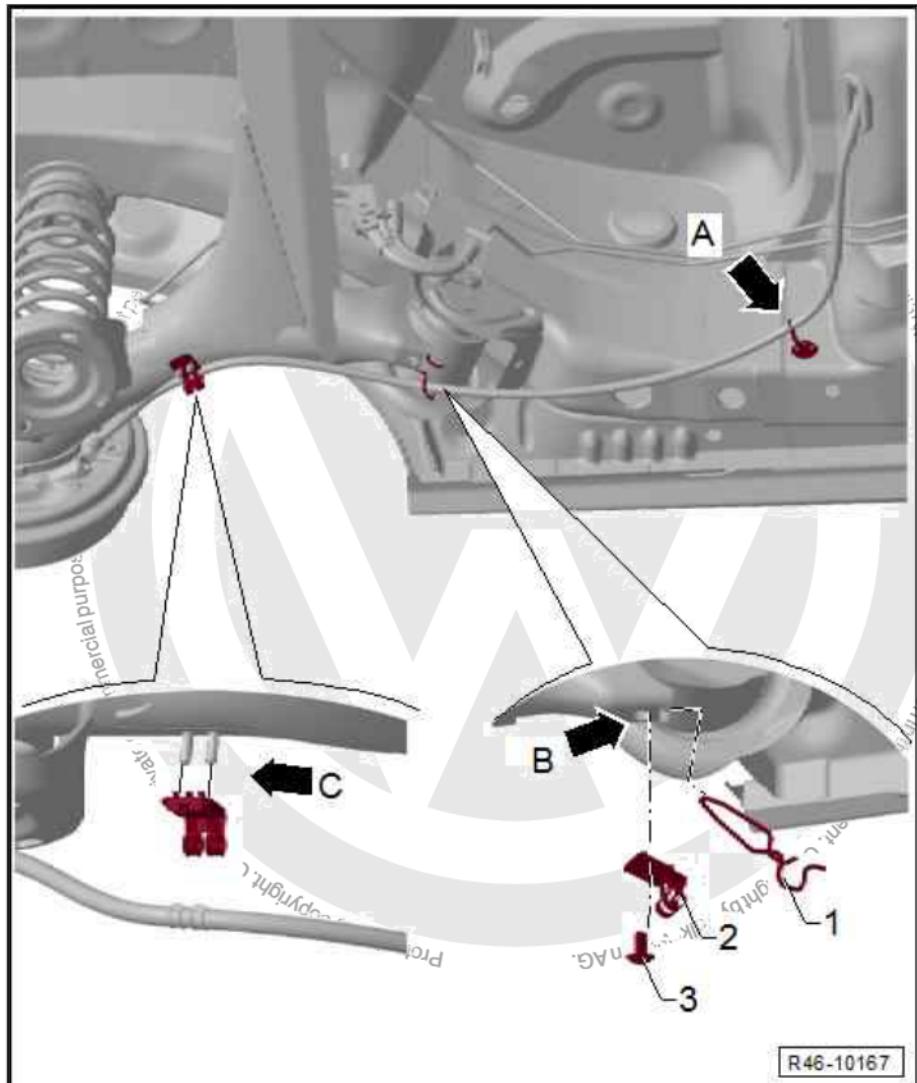
- Release the handbrake cable.
- Detach the handbrake cable from the supports on the rear axle beam -arrows B and C- and supports -arrows A-.



- Pull the handbrake cable in the direction of the arrow, out of the guide tube -1-.

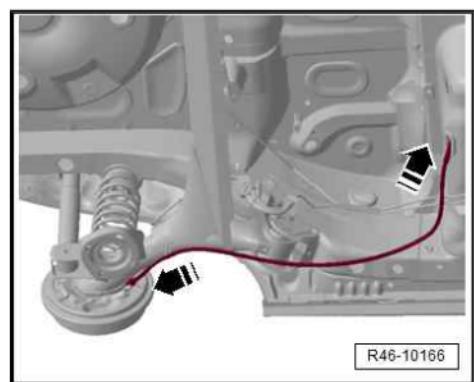


Protected by copyright. Copying or private use of commercial purposes, in part or in whole, is not permitted unless authorised by Volkswagen AG. Volkswagen AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright © Volkswagen AG.

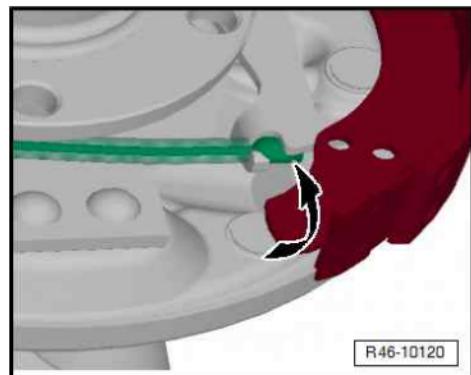


3.2.2 Installation

- Pull the handbrake cable in the direction of the -arrow- into the guide tube -1-.

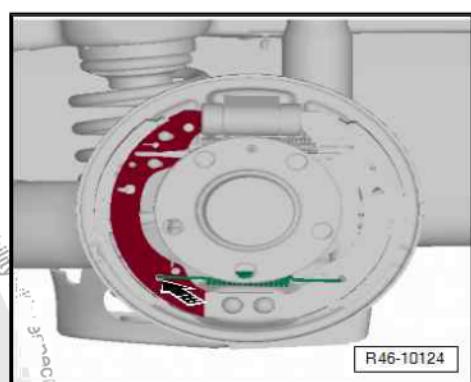


- Couple the handbrake cable to the brake lever.



- Place the lower return spring and couple the brake shoe behind the lower support.
- Press the compression spring with the spring dish.
- Install the brake drum [=> page 69](#) .

Fasten the handbrake cable in the following sequence:

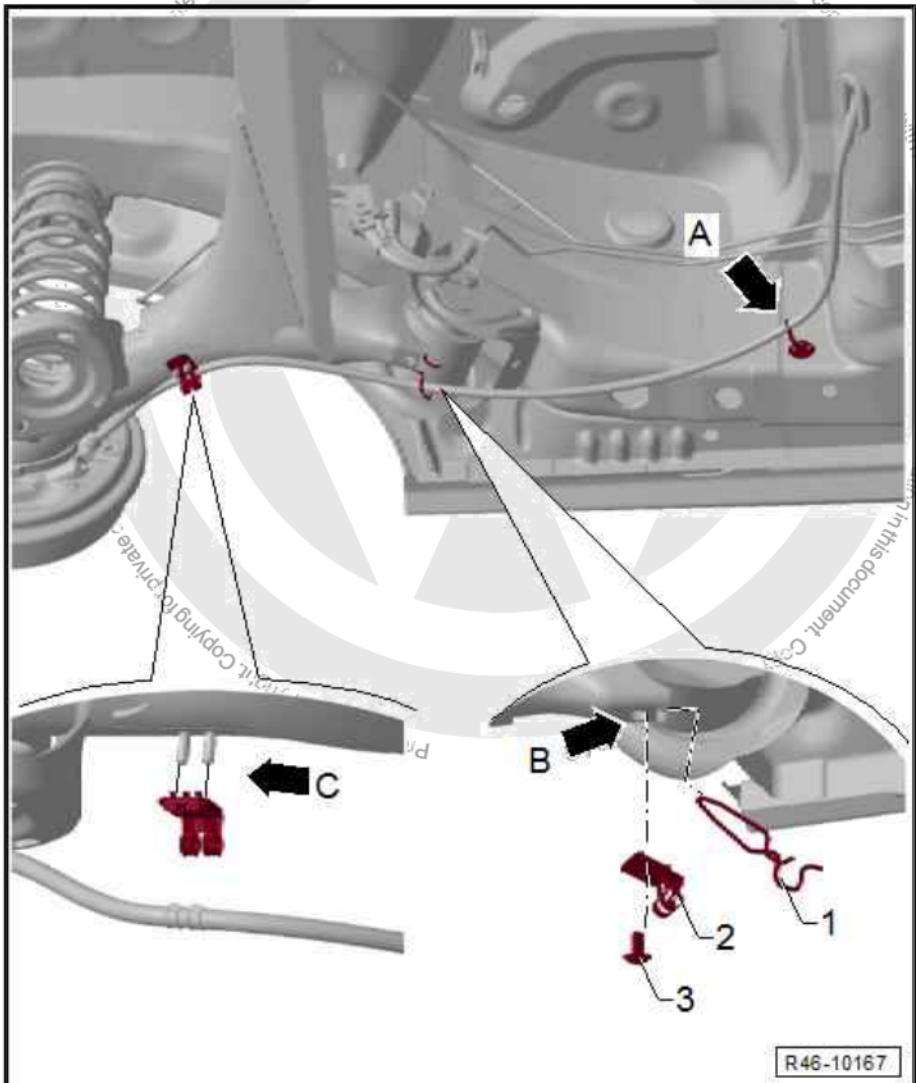




A - On the handbrake cable support.

B - On the handbrake cable support on the rear axle beam, depending on the version:

- ◆ Version -1- Support.
- ◆ Version -2- Support with securing bolt -3- with torque of 5 Nm.
- C - On the rear axle beam handbrake fastening clip.
- ◆ The handbrake cable fastening ring must be in the middle of the clip.

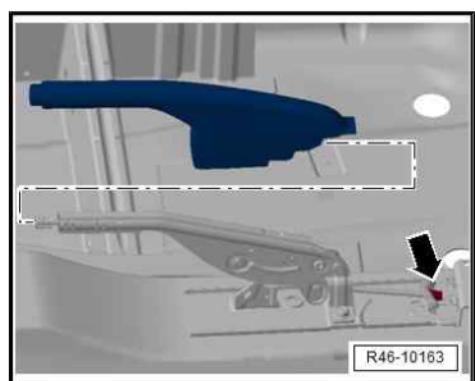


R46-10167

- Fit the handbrake cable to the compensator.
- Previously tighten the handbrake cable with the nut -arrow-.
- Install the wheels.

For tightening torques, refer to: ⇒ Chassis, axles, steering; Rep. gr. 44 ; Vehicle wheels, tires, vehicle measurement .

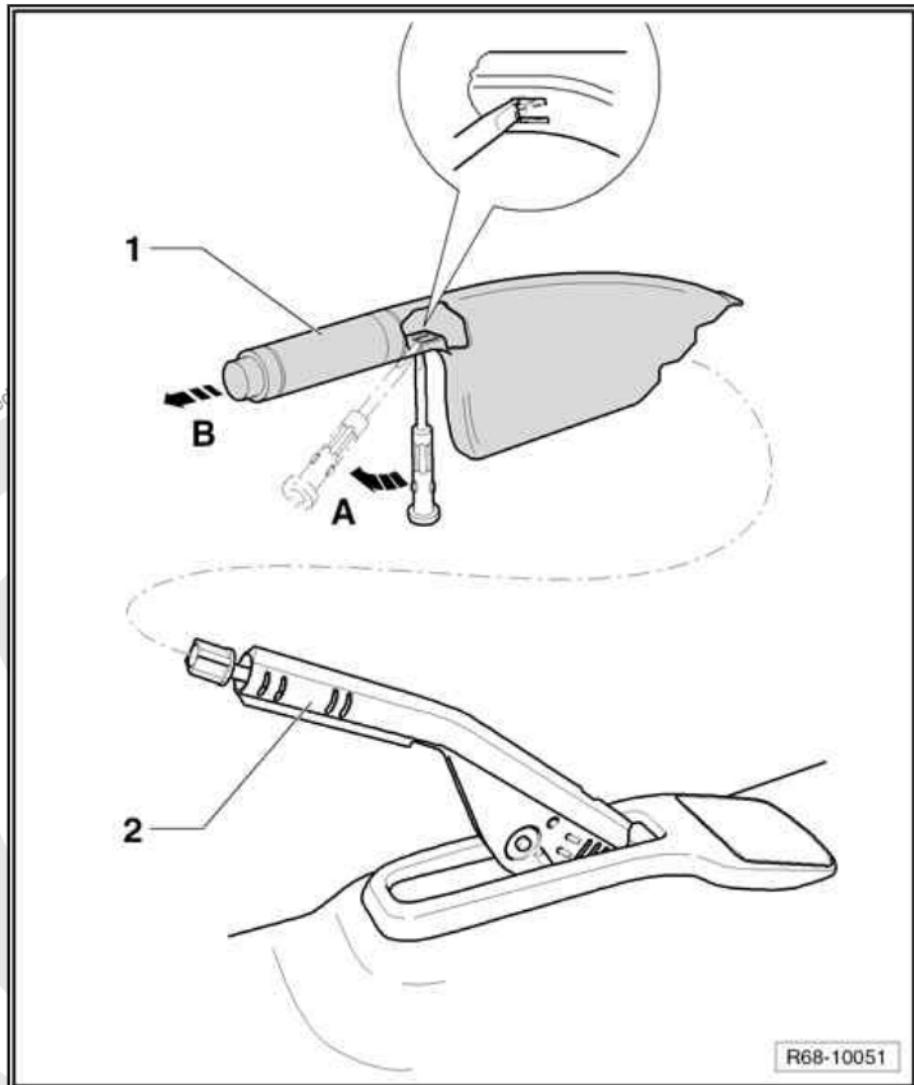
- Adjust the handbrake ⇒ [page 74](#) .
- Fasten the floor protection.
- Install the handbrake finishing adjustment cover.



R46-10163

3.3 Handbrake lever handle - remove and install

Removal:



R68-10051

- Pull the handbrake lever handle -2- up.
- Fit a small screwdriver in the lever opening and press against the handle -arrow A-.
- Remove the handle -1- from the handbrake lever -2- by pulling towards the front -arrow B-.

Installation:

Installation is performed in the reverse sequence to the removal.

3.4 Handbrake lever - remove and install

3.4.1 Removal

- Remove the lid to access the handbrake adjustment nut.

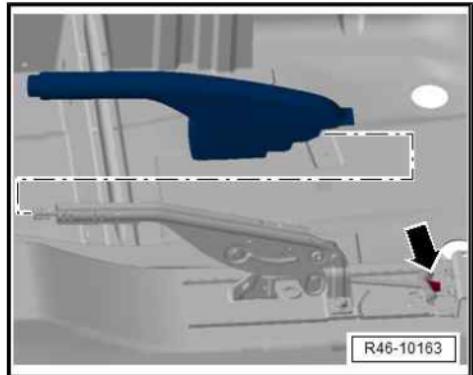


Note

To perform the next operation, the handbrake lever cannot be engaged.

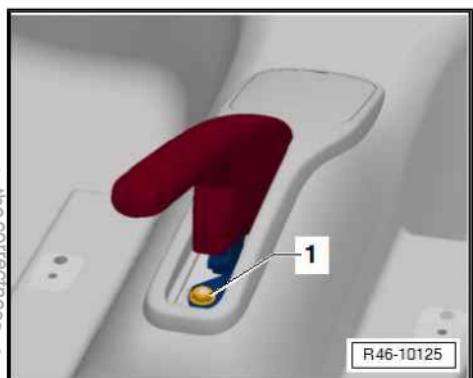


- Loosen the nut -arrow- until the handbrake cable can hang out of the compensator.
- Engage the handbrake lever.



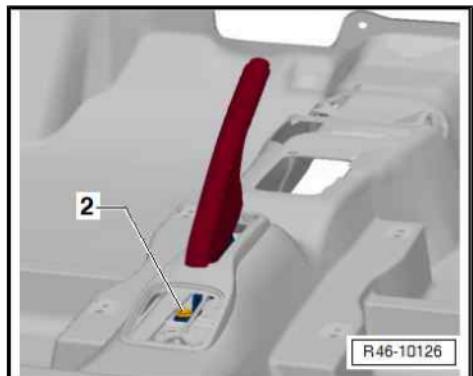
R46-10163

- Remove the nut -1- with an articulated wrench.
- Release (disengage) the handbrake lever.



R46-10125

- Remove the nut -2- through the access to the handbrake adjustment nut.
- Disengage the handbrake sensor connector.
- Remove the lever.



R46-10126

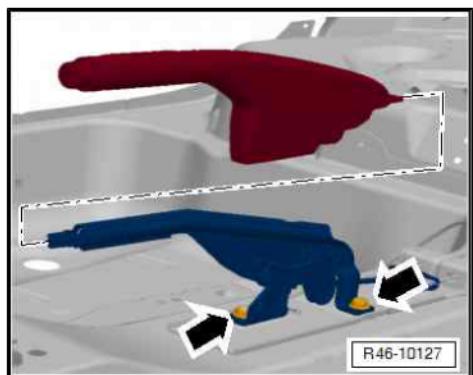
3.4.2 Installation

- Installation is carried out in the reverse order of removal.
- Fasten the bolts -arrows- to the handbrake lever with the torque of 20 Nm + 90°.



Note

The nuts must be replaced whenever removed.



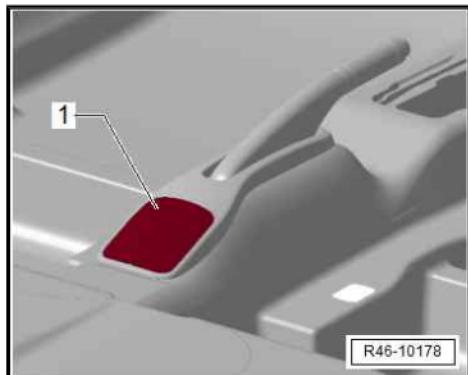
R46-10127



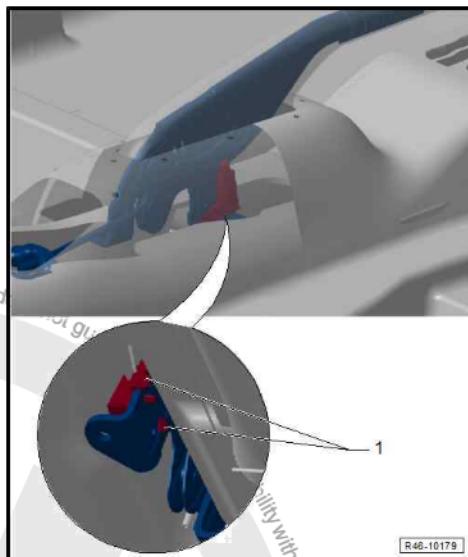
3.5 Handbrake switch - remove and install

3.5.1 Removal

- Remove the handbrake lever handle [page 81](#).
- Remove the cover -1- from the access to the handbrake adjustment.
- Disengage the handbrake switch connector.



- Remove the handbrake switch by releasing the locks -1- through the access to the handbrake adjustment, if necessary.



3.5.2 Installation

The installation is performed in the reverse sequence from the removal.



Note

- ◆ Only use the access to the handbrake adjustment if necessary.
- ◆ The assemble is easier with the operator on the passenger seat.



4 Brake pedal - assembly overview



WARNING

The brake pedal travel should not be shortened with additional floor linings.

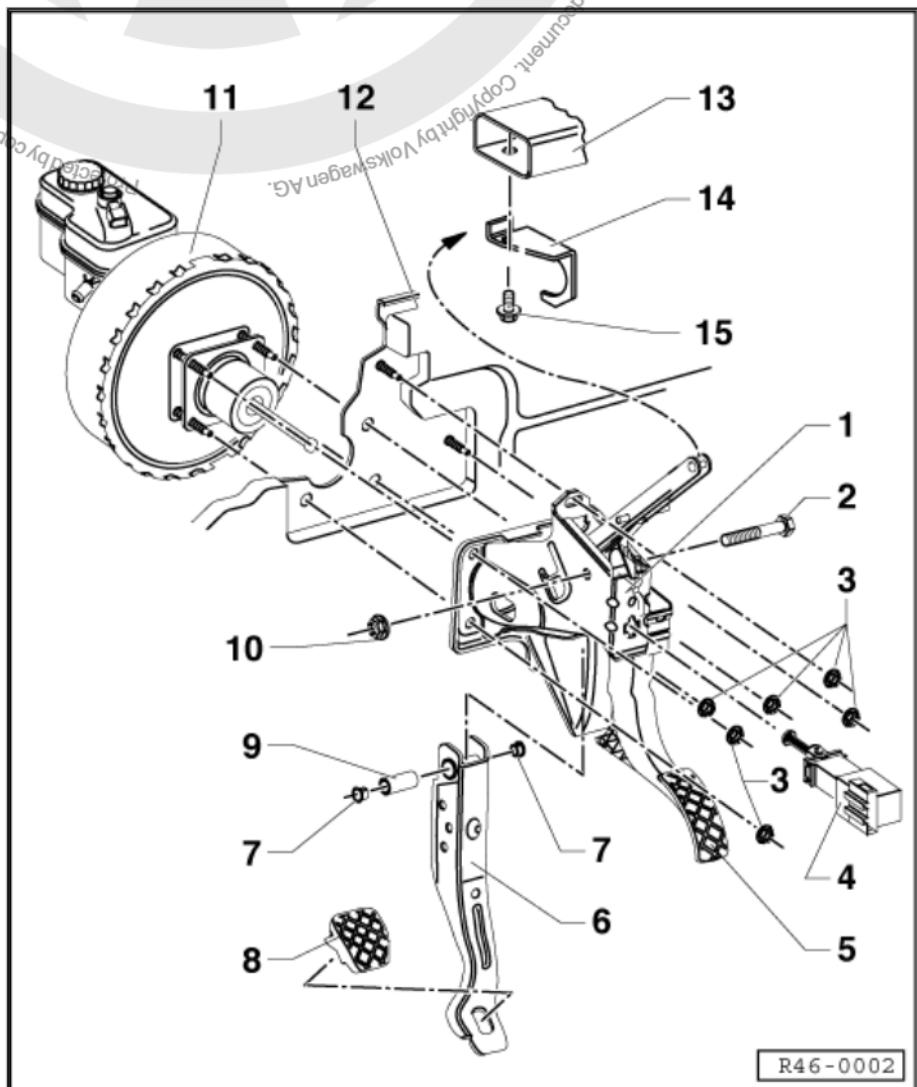
Before the assembly, all support points must be lubricated with Grease - G-000 602-. Refer to the ⇒ Chemicals Manual .



WARNING

Always replace self-locking nuts and bolts subject to angular torque

- 1 - Mounting bracket
- 2 - Hexagonal head bolt
- 3 - Self-locking hex head nut
 - Replace whenever removed
 - 28 Nm
- 4 - Brake pedal switch - F47-
 - before assembling the Brake pedal switch - F47-, the brake pedal must be fitted with the brake servo selector rod
[⇒ page 87](#)
 - remove and install
[⇒ page 89](#)
- 5 - Accelerator pedal
- 6 - Brake pedal
- 7 - Bearing bush
- 8 - Cover
- 9 - Support pin
- 10 - Self-locking hex head nut
 - Replace whenever removed
 - 25 Nm
- 11 - Brake servo
- 12 - Front panel
- 13 - Module support
- 14 - Crash bar anchor
- 15 - Hexagonal head bolt
 - 10 Nm



R46-0002

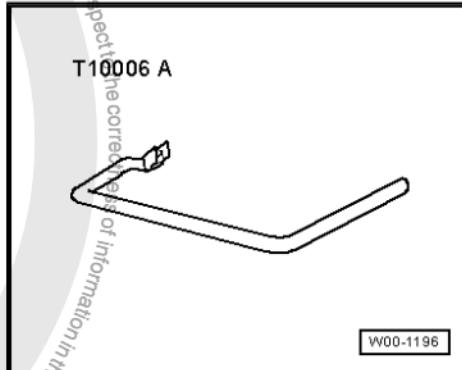


4.1 Brake pedal - separate

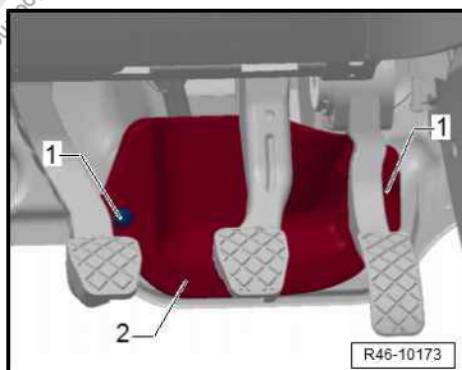
4.1.1 Separate brake pedal from brake servo

Special tools and workshop equipment required

- ♦ Wrench - T 10006A-



- Remove the bolts -1-.
- Remove the cover -2-.
- Remove the Brake pedal switch - F47- , turning it 45° to the left.



- Then, press and hold the brake pedal towards the brake servo.

1 - Brake pedal

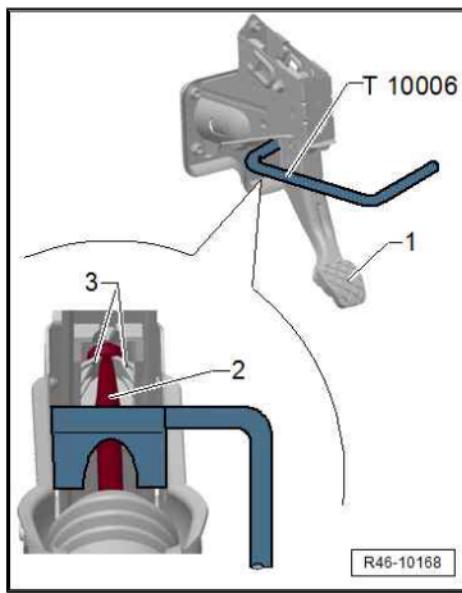
2 - Brake cylinder selector rod

3 - Fastening shoulders

- Position Wrench - T 10006A- and pull towards the driver's seat, at the same time hold the brake pedal (at this time, the pedal cannot move backwards). With this, the fastening shoulders -3- of the operating rod ball head seat are pressed away from the operating rod -2-.

The picture displays a better way to represent the brake servo pedal separation without representing the pedals.

- Pull Wrench - T 10006A- together with the brake pedal towards the driver's seat. (With this, the brake pedal is pulled out of the operating rod ball head).



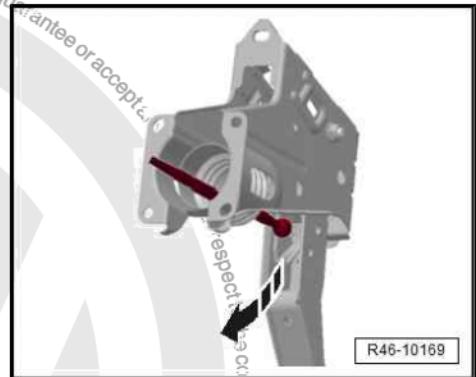


4.1.2 Fasten brake pedal to brake servo

- Hold the selector rod ball head in front of the seat and press the brake pedal towards the brake servo until the ball head coupling is heard.

Installation is performed in the reverse sequence to the removal

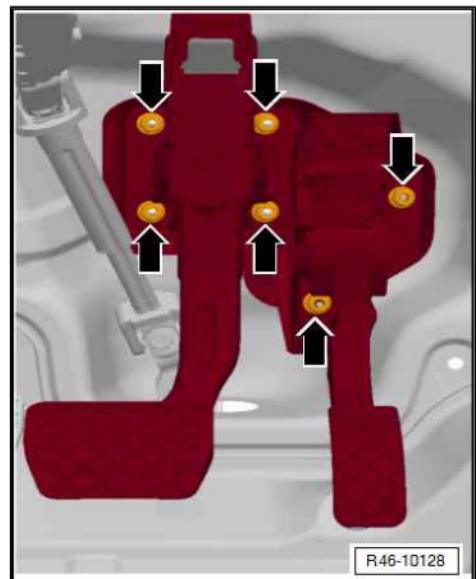
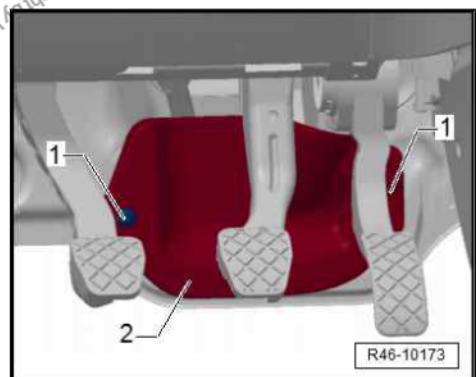
- Install and adjust the Brake pedal switch - F47- [⇒ page 89](#) .



4.2 Pedal set - remove and install

4.2.1 Removal

- Remove dash panel ⇒ Electrical system; Rep. gr. 90 ; Instrument case, indicators .
- Remove the driver's side cover ⇒ General body repairs, interior; Rep. gr. 68 ; Internal equipment .
- Remove heating baffle ⇒ Heating, air conditioning; Rep. gr. 80 ; Heating .
- Remove the bolts -1-.
- Remove the cover -2-.
- Remove the Brake pedal switch - F47- , turning it 45° to the left.
- Disconnect the accelerator cable.
- On vehicles with accelerator pedal position sensor, release the connector under the dash panel.
- Separate the brake pedal from the brake servo [⇒ page 86](#) .
- Remove the pedal set, loosening the nuts -arrows-.





4.2.2 Installation

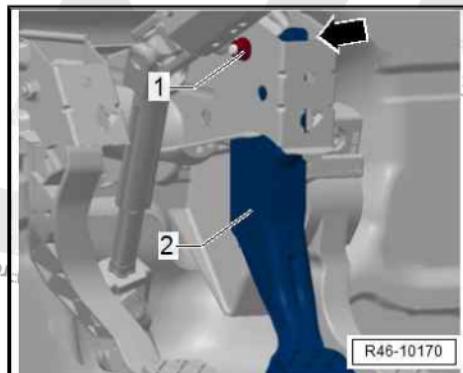
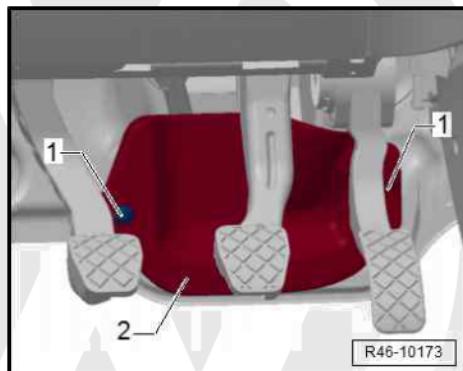
The installation is performed in the reverse sequence from the removal.

- Install and adjust the Brake pedal switch - F47- [⇒ page 89](#) .

4.3 Brake pedal - remove and install

4.3.1 Removal

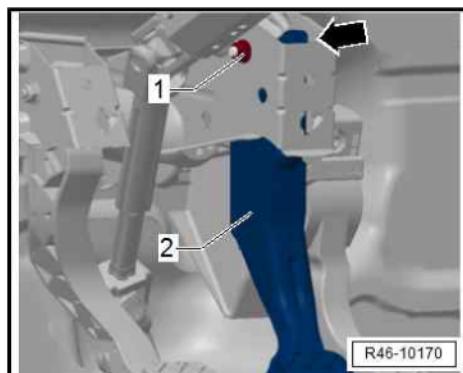
- Remove heating baffle ⇒ Heating, air conditioning; Rep. gr. 80 ; Heating .
- Remove the bolts -1-.
- Remove the cover -2-.
- Remove the Brake pedal switch - F47- , turning it 45° to the left.
- Disengage the accelerator cable.
- On vehicles with accelerator pedal position sensor, release the connector under the dash panels
- Separate the brake pedal from the brake servo [⇒ page 86](#) .
- Unscrew the hexagonal nut -1- and remove the hexagonal head bolt -arrow-.
- Remove the brake pedal -2-.



4.3.2 Installation

Installation is performed in the reverse sequence of the removal.

- The tightening torque for the hexagonal nut -1-is 25 Nm.
- Install and adjust the Brake pedal switch - F47- [⇒ page 89](#) .





4.4 Brake pedal switch - F47- - remove and install

4.4.1 Removal

- Disconnect the brake light connector.
- Remove the Brake pedal switch - F47- , rotating it 45° to the left.

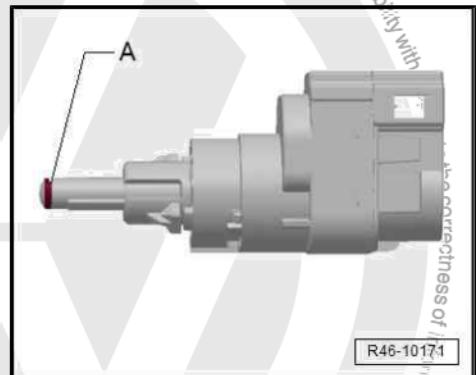
4.4.2 Install and adjust

- Before installing, apply Lubricating putty - G 052 142 A2- on the rod tip, area -A-. Refer to the ⇒ Chemicals Manual .

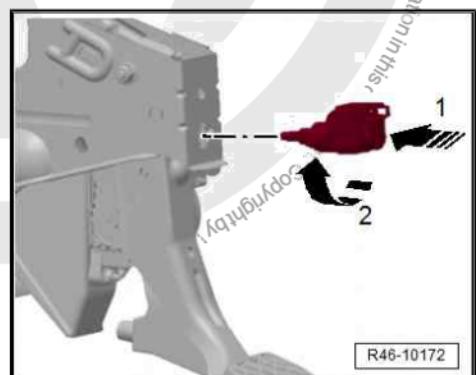


Note

The installation of the Brake pedal switch - F47- must be carried out with the brake pedal in rest position. The brake pedal may not be activated before the end of the procedure



- Insert the Brake pedal switch - F47- in its respective housing and press it slightly against the brake pedal -arrow 1- and fasten by turning it (45°) to the right -arrow 2-.
- Connect the connector for the Brake pedal switch - F47- .
- Depress the brake pedal and check whether the brake light (rear of vehicle) lights.





47 – Brakes - hydraulics

1 Assembly overview: Brake servo/brake master cylinder

The brake master cylinder and the brake servo can be independently replaced.

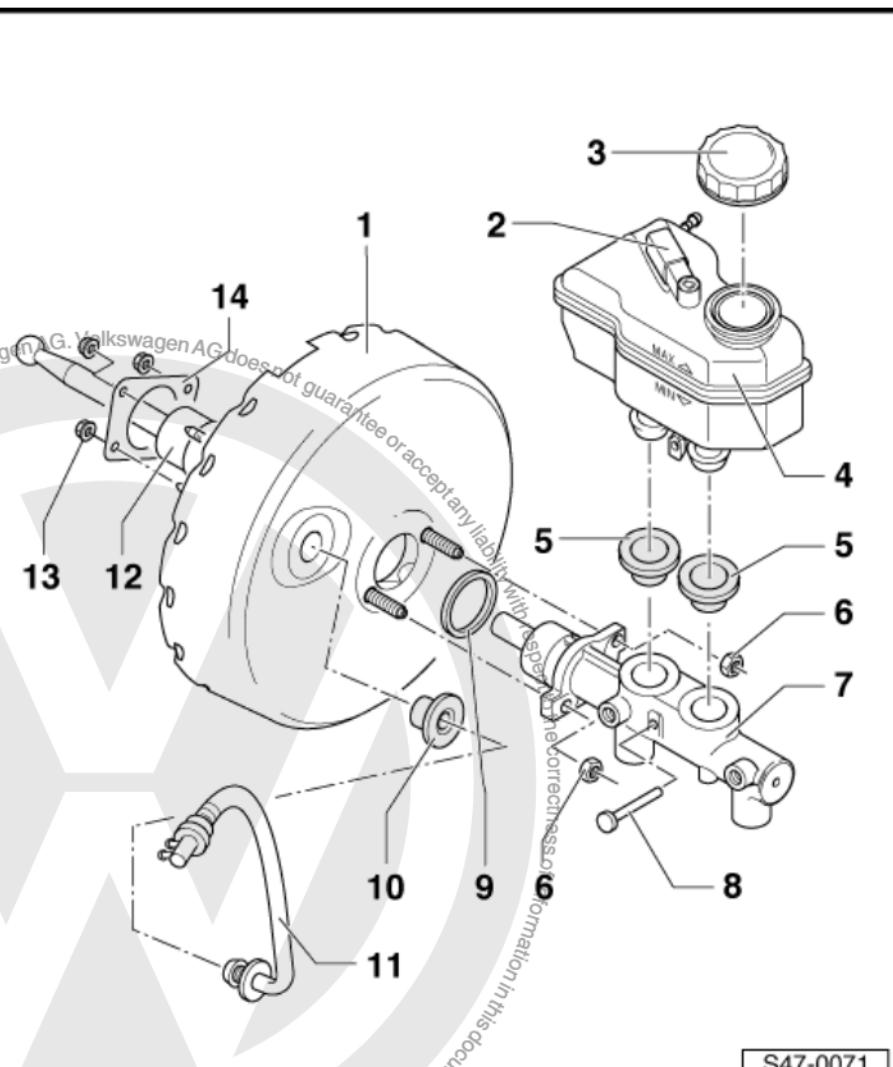


WARNING

Always replace self-locking nuts and bolts subject to angular torque

1 - Brake servo

- On petrol engines, the vacuum required is removed from the intake manifold.
- On diesel engines, a vacuum pump is installed to create vacuum.
- Check the operation
- Press the brake pedal several times with the engine stopped (this eliminates any remaining vacuum inside the device).
- Now, hold the brake pedal in the braking position using average foot pressure and start the engine. When the brake servo is working properly, this can be felt with a foot on the brake pedal (the amplification is active).
in case of faults, replace completely
- Non-return valve (in the vacuum line). Check the operation [⇒ page 93](#)
- separate from the brake pedal [⇒ page 86](#)
- remove and install





[⇒ page 93 .](#)

- 2 - Brake oil level warning contact - F34
- 3 - Sealing plug
- 4 - Brake fluid reservoir
- 5 - Sealing plug
 - moisten with brake fluid and introduce into the brake cylinder
- 6 - Self-locking hex head nut
 - Replace whenever removed
 - 20 Nm
- 7 - Brake master cylinder
 - cannot be repaired. In case of faults, replace completely
- 8 - Retaining pin
 - insert through the brake cylinder
- 9 - Seal
 - Replace whenever removed
- 10 - Sealing plug
- 11 - Vacuum line
 - Install in the brake servo
- 12 - Bellows
 - ensure proper seating, aspiration noises may occur
- 13 - Self-locking hex head nut
 - Replace whenever removed
 - 28 Nm
- 14 - Sealing
 - to brake servo



1.1 Master cylinder - remove and install

Special tools and workshop equipment required

3094		V.A.G 1331	
V.A.G 1869		VAS 5234	
Protected by copyright. Copying or commercial use is not permitted unless authorised by Volkswagen AG. Volkswagen AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by Volkswagen AG.			

- ◆ Clamps (diameter 25 mm) - 3094-
- ◆ Torque wrench - 5 to 50Nm (1/2" drive) - VAG 1331-
- ◆ Brake pedal pressing device - VAG 1869/2-
- ◆ Brake filling and bleeding equipment - VAS 5234-

1.1.1 Removal

- Note the coding in vehicles with code radio equipment, request such coding if necessary.
- Disconnect the battery ⇒ Electrical system; Rep. gr. 27 ; Starter, alternator, battery .
- Place an adequate number of lint-free cloths in the area around the water reservoir, engine and transmission.
- Draw as much brake fluid as possible from the reservoir by using Brake filling and bleeding equipment - VAS 5234- or Accessory set for bleeder - V.A.G 1869/4- .
- Close the clutch cylinder return hose with the clamps (diam. 25 mm) - 3094- .



- Disconnect the clutch cylinder return hose.
- Disconnect the Brake oil level warning contact - F34-
- Release the brake pipes from the brake cylinder and close them with the plugs from the number ET 1H0 698 311 A repair set.
- Release the brake cylinder nuts.
- Carefully remove the brake servo master cylinder.

1.1.2 Installation

Both vehicles

- The installation is performed in the reverse sequence from the removal.

When installing, pay special attention to the following points:

- When joining the brake master cylinder to the brake servo, ensure the selector rod is properly seated in the brake master cylinder.
- Screw the brake cylinder nuts to 20 Nm.
Tightening torque for the brake pipes 14 Nm.
- Connect the brake pipes.

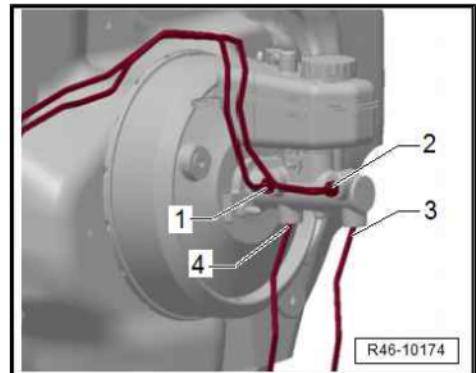
Vehicles without ABS

- ◆ -1- Right front break tube
- ◆ -2- Left front break tube
- ◆ -3-Rear break tube for breaking power adjuster [⇒ page 111](#)
- ◆ -4-Rear break tube for breaking power adjuster [⇒ page 111](#)

Vehicles with ABS 5.7 [⇒ page 20](#)

Vehicles with ABS 8.0 [⇒ page 28](#)

- Bleed the brake system [⇒ page 114](#).



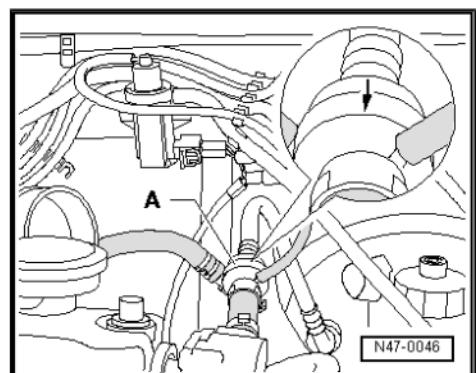
1.2 Inspect the non-return valve

- Inspect the non-return valve
-A-

Air must pass through the valve in the arrow direction.

The valve must remain closed in the opposite direction.

Pay attention to the correct assembly position.

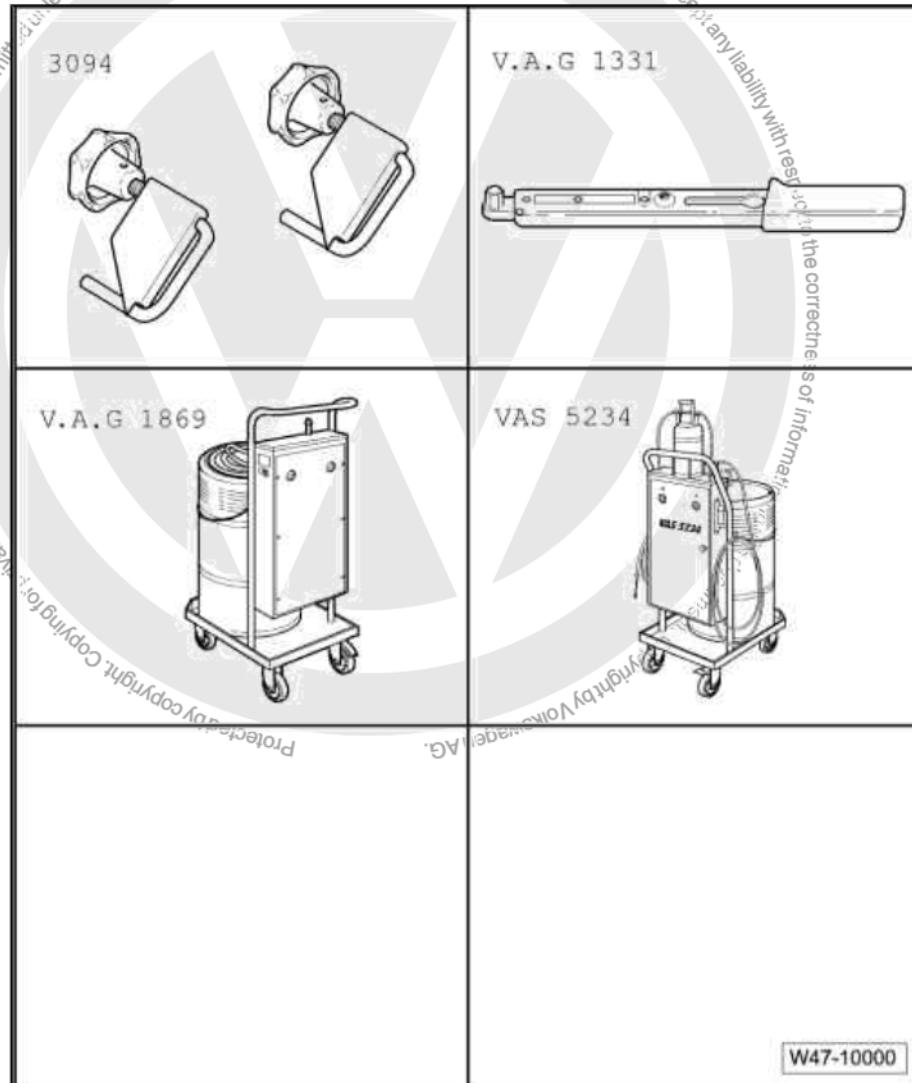


1.3 Brake servo - remove and install



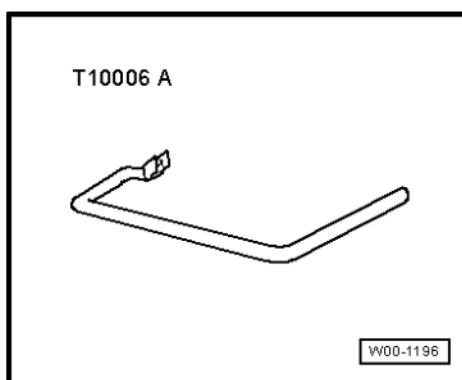
Special tools and workshop equipment required

Protected by Copyright. Copying for
commercial purposes, in part or in whole, is not permitted.



W47-10000

- ◆ Clamps (diameter 25 mm) - 3094-
- ◆ Torque wrench - 5 to 50Nm (1/2" drive) - VAG 1331-
- ◆ Break bleeding device - V.A.G 1869-
- ◆ Brake filling and bleeding equipment - VAS 5234-
- ◆ Wrench - T 10006A-



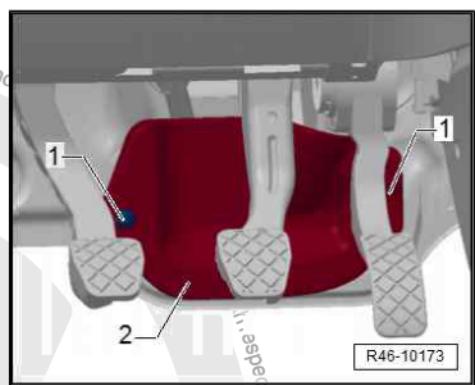
W00-1196

1.3.1 Removal

- Remove the driver's side cover ⇒ General body repairs, interior; Rep. gr. 68 ; Internal equipment .



- Remove heating baffle ⇒ Heating, air conditioning; Rep. gr. 80 ; Heating .
- Remove air filter ⇒ Engine - Supply and ignition system ; Rep. gr. 24 ; Supply system - fuel injection .
- Note the coding in vehicles with code radio equipment, request such coding if necessary.
- Disconnect the battery ⇒ Electrical system; Rep. gr. 27 ; Starter, alternator, battery .
- Place an adequate number of lint-free cloths in the area around the water reservoir, engine and transmission.
- Draw as much brake fluid as possible from the reservoir by using Brake filling and bleeding equipment - VAS 5234- or Accessory set for bleeder - V.A.G 1869/4- .
- Close the clutch cylinder return hose with the tool 3094.
- Disconnect the clutch cylinder return hose.
- Disconnect the Brake oil level warning contact - F34- .
- Release the brake pipes from the brake cylinder and close them with the plugs from the number ET 1H0 698 311 A repair set.
- Disconnect the vacuum line from the brake servo.
- Remove the lining underneath the dash panel.
- Remove the bolts -1-.
- Remove the cover -2-.
- Disconnect the brake light connector.
- Remove the Brake pedal switch - F47- , turning it 45° to the left.



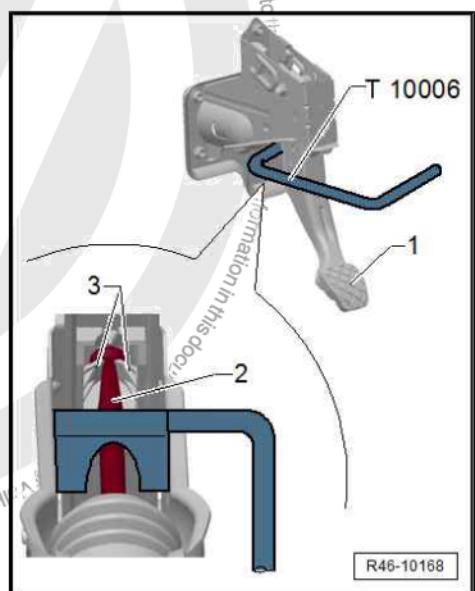
- Then, press and hold the brake pedal towards the brake servo.

1 - Brake pedal
 2 - Brake cylinder selector rod
 3 - Fastening shoulders

- Position Wrench - T 10006A- and pull towards the driver's seat, at the same time hold the brake pedal (at this time, the pedal cannot move backwards). With this, the fastening shoulders -3- of the selector rod ball head seat are pressed away from the selector rod -2-.

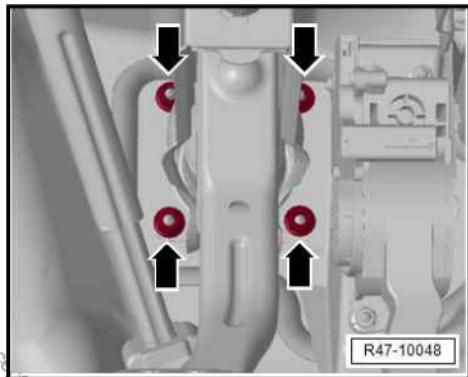
The figure displays a better way to represent the separation between the brake pedal and the brake servo without representing the pedal set.

- Pull Wrench - T 10006A- together with the brake pedal towards the driver's seat. (With this, the brake pedal is pulled out of the operating rod ball head).





- Loosen the hexagonal nuts -arrows-.
- Uncouple the brake servo with the brake master cylinder forward and remove.

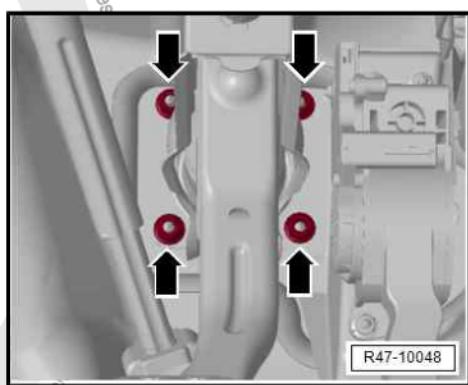


1.3.2 Installation

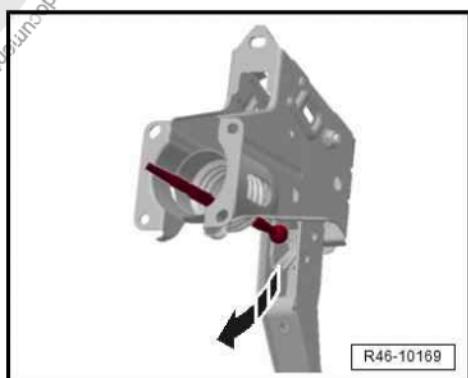
The installation is performed in the reverse sequence from the removal.

- Tightening torque for the hexagonal nuts -arrows- to 28 Nm.

Fasten the brake pedal to the brake servo



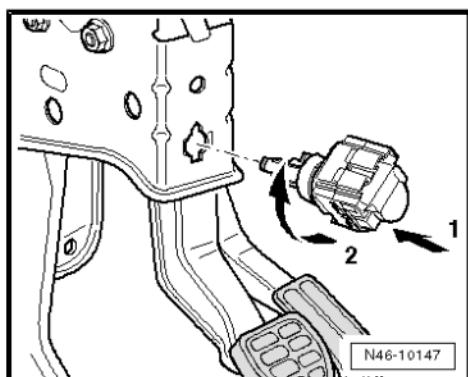
- Hold the operating rod ball head in front of the seat and press the brake pedal towards the brake servo until the ball head coupling is heard.
- Before installing, remove the rod completely.



- Insert the Brake pedal switch - F47- in its respective housing and press it slightly against the brake pedal -arrow 1- and fasten by rotating it (45°) to the right -arrow 2-.
- Here, the brake pedal always remains at rest position.
- Connect the connector for the Brake pedal switch - F47- .
- Check the brake light operation.

After adjusting, check whether the Brake pedal switch - F47- is at the final stop (loose position).

- Bleed the brake system [⇒ page 114](#) .

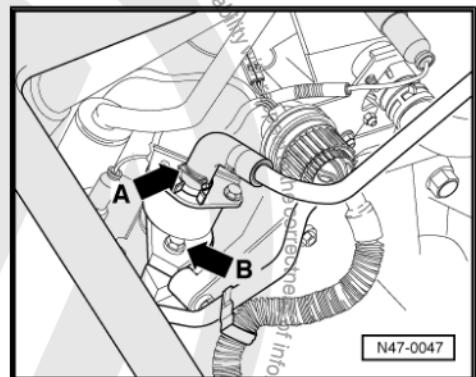




1.4 Vacuum pump for 4-cylinder diesel engines and with distribution injector pump (diesel vehicles) - remove and install

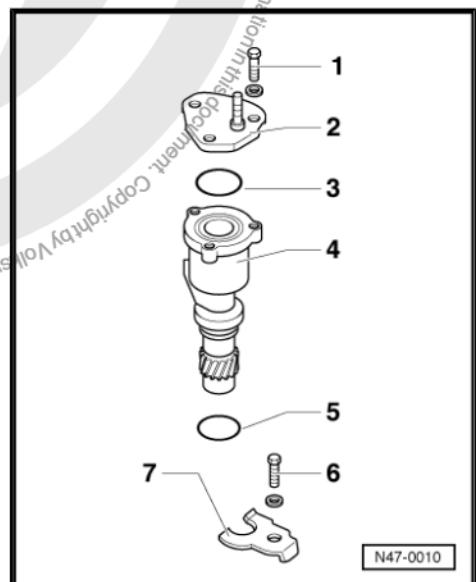
1.4.1 Removal

- Loosen the fastening clamp -arrow A- from the vacuum line, disconnect the hose.
- Loosen the bolt -arrow B- on the head flange.
- Remove the vacuum pump.



Seal the vacuum pump

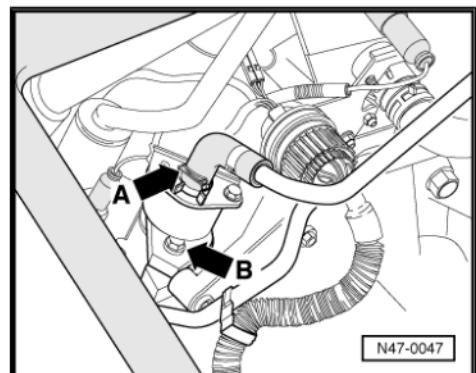
- 1 - Hexagonal head bolt
- 2 - Cap
- 3 - O-Ring
- change
- 4 - Vacuum pump
- 5 - O-Ring
- change
- 6 - Hexagonal head bolt, 20 Nm
- 7 - Mounting bracket
- ◆ It is impossible to repair the vacuum pump.
- ◆ To seal, replace the two rear O-Rings. 3 and 5.



1.4.2 Installation

When installing the vacuum pump, ensure the proper fitting to the driving gear.

- Fasten the bolt -arrow B- to the flange and install the vacuum line with the clamp -arrow A-.





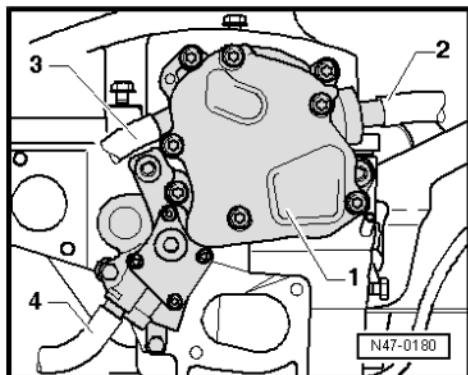
1.4.3 Vacuum pump for 3-cylinder diesel engines

Tandem pump -1- (vacuum pump and fuel pump).

Vacuum line -2- to brake servo with non-return valve.

Fuel tube -3- and -4-

- Remove and install=> Rep. gr. 20 ; Fuel supply system components - remove and install .



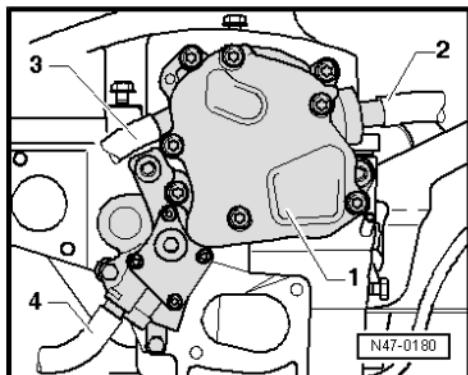
1.4.4 Vacuum pump for 4-cylinder diesel engines with injector pump unit

Tandem pump -1- (vacuum pump and fuel pump).

Vacuum line -2- to brake servo with non-return valve.

Fuel tube sets -3- and -4-.

- Remove and install=> Rep. gr. 20 ; Fuel supply system components - remove and install; .



Protected by copyright. Copying or private use of this document is illegal.
Copyright by Volkswagen AG.
This document is not permitted to be copied or reproduced, in part or in whole, without authorisation by Volkswagen AG. Volkswagen AG does not guarantee or accept any liability with respect to the correctness of information in this document.



2 Vacuum system - Check

2.1 Test instructions

Inspection instructions

In case of complaints regarding the servo brake or the so-called »hard brake pedal«, they must be used as support and guide for an effective and objective search for faults.

This control covers the following components:

- ◆ Brake servo
- ◆ Sealing ring between the master cylinder of the brake and servo brake
- ◆ Non return valve
- ◆ Vacuum hoses with fitting connections
- ◆ Vacuum pump (if applicable)

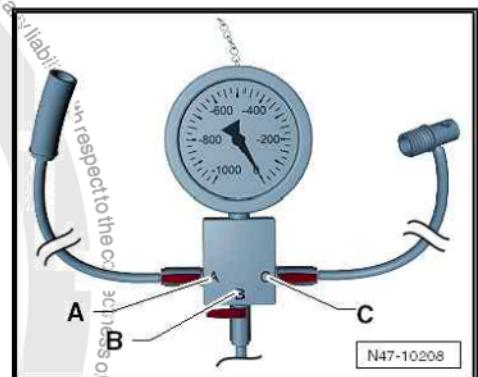
The results of measurement procedures are influenced by geographical position. The higher the altitude (compared to sea level), the lower the air pressure.

Observe verification conditions:

- ◆ Visual inspection of all vacuum hoses for damages (e.g. cracks or "ruptures") as well as proper fitting.
- ◆ Ensure proper cleanliness during vacuum system services.
- ◆ Clean the engine compartment before initiating activities, if necessary.

Special tools and workshop equipment required

- ◆ Servo brake vacuum measurement device - VAS 6721-

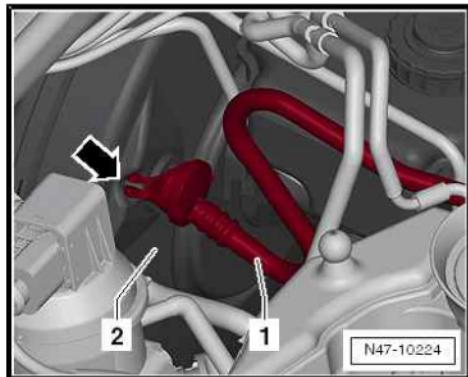




2.2 Servo brake vacuum measurement device - VAS 6721- - connect

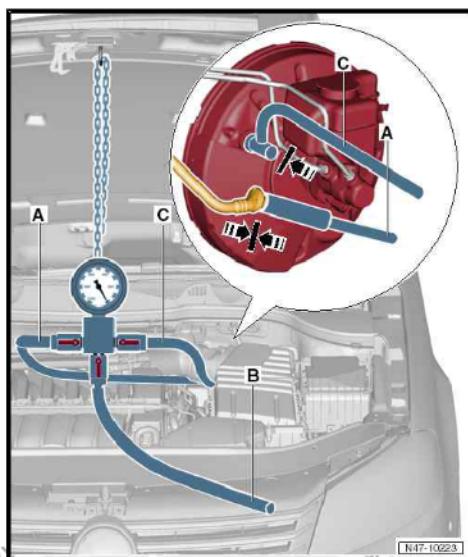
- Remove the vacuum hose -1- from the servo brake -2-.

To facilitate the vacuum hose disassembly procedure, press the brake pedal several times with the engine switched off.

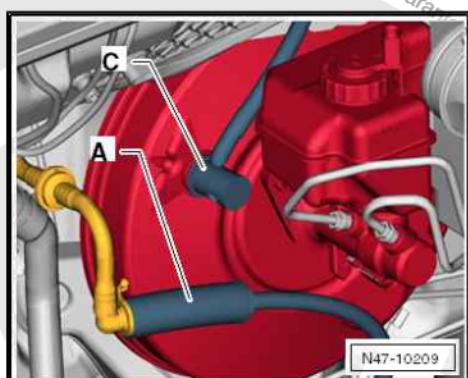


- Insert the servo brake vacuum measurement device - VAS 6721- -check the following figures-.

Position	Component	Clarification
A	Closing valve	towards the vacuum hose, retention valve, and vacuum pump, if applicable
B	Closing valve	<ul style="list-style-type: none">◆ Open to easily disassemble the servo brake vacuum measurement device - VAS 6721-◆ Open to simulate an error source◆ Connect the main vacuum pump - VAS 6213-
C	Closing valve	towards the servo brake



- Insert hose -A- of the servo brake vacuum measurement device - VAS 6721- in the vacuum hose.
- Press adaptor -C- in the servo brake.





2.3 Vacuum generation control



Note

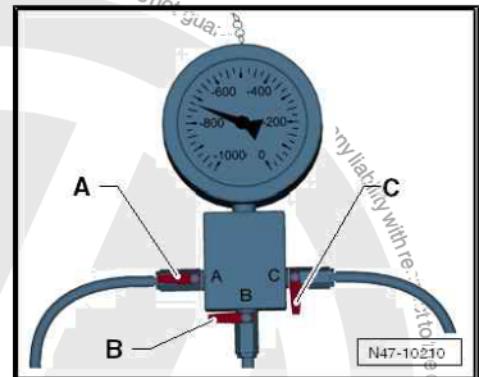
- ◆ Atmospheric air pressure is 1013 mbar at sea level (N.N.).
 - ◆ Air pressure lowers as altitude increases (approx. 100 mbar/1000 m altitude).
 - ◆ Local and climate variations also affect vacuum generation.
 - ◆ Cold engines, activated air conditioning systems, or simply an idling engine negatively affect vacuum generation.
- Previously test all vacuum hoses for damages (e.g. cracks or "ruptures") as well as to proper fitting.
 - Connect the servo brake vacuum measurement device - VAS 6721- [⇒ page 100](#)
 - Open closing valve -A- .
 - Close closing valves -B- and -C- .
 - Run the engine at service temperature (>60 °C); briefly press the gas pedal once (engine rotation in excess of 2,000 rpm).
 - Read the indicated measurement.

In normal circumstances (check indications), the generated vacuum must be between 600 and 950 mbar (depending on the engine).

If such values are not reached, despite meeting all requirements (check indications), the vacuum system must initially be tested for leaks.

- Comparatively, generate vacuum with the manual vacuum pump - VAS 6213- [⇒ page 103](#) .

To facilitate disassembly of adaptor and hose connections, open the closing valve -B- .



2.4 Leak control



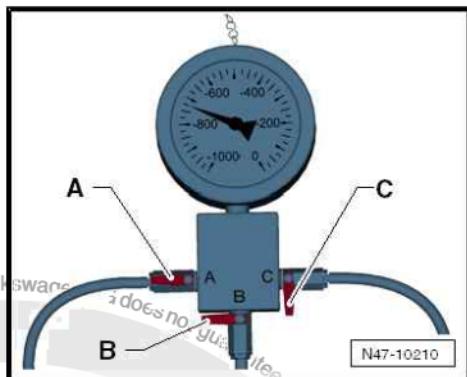
Note

- ◆ Atmospheric air pressure is 1013 mbar at sea level (N.N.).
 - ◆ Air pressure lowers as altitude increases (approx. 100 mbar/1000 m altitude).
 - ◆ Local and climate variations also affect vacuum generation.
 - ◆ Cold engines, activated air conditioning systems, or simply an idling engine negatively affect vacuum generation.
- Previously test all vacuum hoses for damages (e.g. cracks or "ruptures") as well as to proper fitting.
 - Connect the servo brake vacuum measurement device - VAS 6721- [⇒ page 100](#)
 - Open closing valve -A- .



- Close closing valves -B- and -C-.
- Run the engine at service temperature ($>60^{\circ}\text{C}$); briefly press the gas pedal once (engine rotation in excess of 2,000 rpm).

In normal circumstances (check indications), the generated vacuum must be between 600 and 950 mbar (depending on the engine).



- Open closing valve -C- to evacuate the servo brake.
- Switch the engine off.
- Read and register the indicated measurement.

Vacuum must lower by 400 mbar in 12 hours.

In case of greater vacuum drop, you must test the leakage point located in the region of the ...

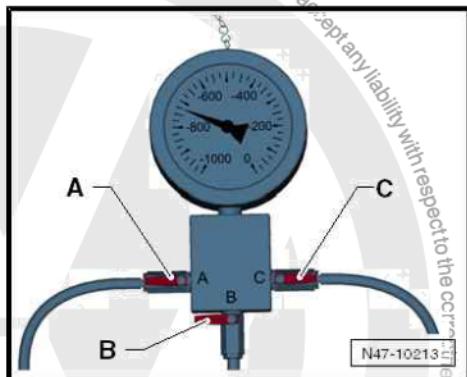
- 1 - Brake servo
- or
- 2 - Retention valve, vacuum hoses with connectors and intake manifold/vacuum pump

In case of major leaks, vacuum drops abruptly within a few seconds.

Perform vacuum control in the servo brake region:

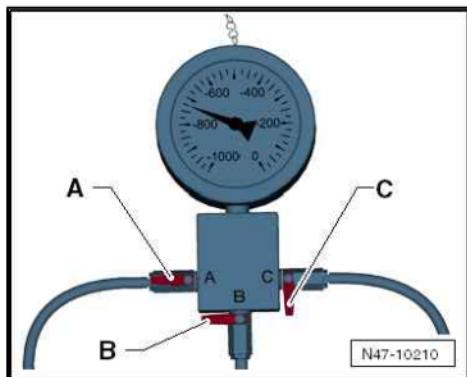
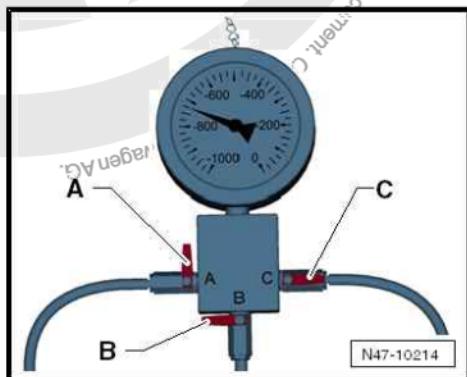
- After generating vacuum, close the closing valve -A-, to test the servo brake vacuum system.

Check the vacuum in the retention valve area, vacuum hose with connectors and suction tube/vacuum pump:



- After generating vacuum, close the closing valve -C-, to check the vacuum system of the servo brake vacuum measurement device - VAS 6721- until the suction tube or vacuum pump.

To facilitate disassembly of adaptor and hose connections, open the closing valve -B- .

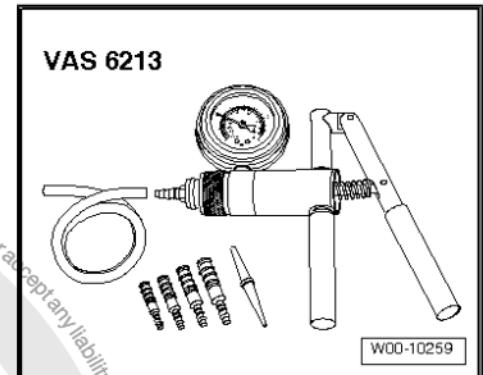




2.5 Vacuum generation with the manual vacuum pump - VAS 6213-

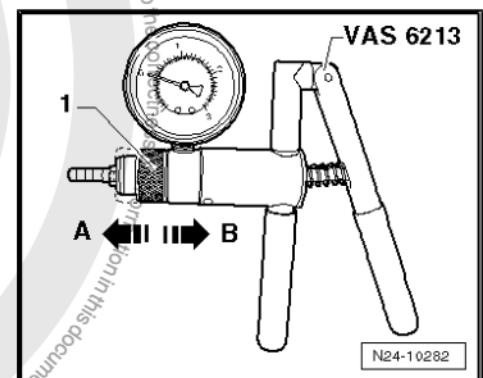
Special tools and workshop equipment required

- ◆ Manual vacuum pump - VAS 6213-

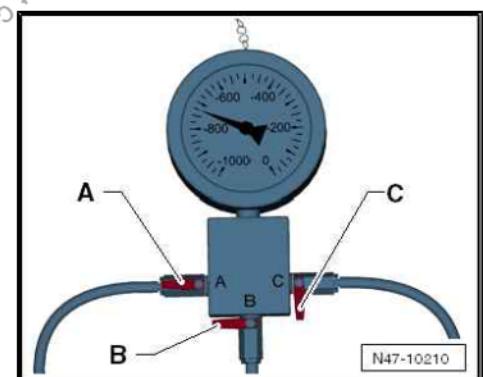


In some cases vacuum may also be generated by the manual vacuum pump - VAS 6213-, instead of the vacuum pump or the engine.

- Switch the sliding ring -1- of the manual vacuum pump - VAS 6213- from position -A- to "vacuum".



- For such, insert the manual vacuum pump - VAS 6213- in the vacuum hose of connection -B- in the servo brake vacuum measurement device - VAS 6721- .
- Open closing valve -B- .
- Generate vacuum with the manual vacuum pump - VAS 6213- , until the servo brake vacuum measurement device - VAS 6721- reads between 600 and 950 mbar.
- Next, execute corresponding controls.





3 Front brake caliper, FS II brake caliper - repair

- ◆ In case of repairs, install the full repair set.
- ◆ New brake calipers are filled with brake fluid and previously bled.
- ◆ Apply a light coat of Grease - G 052 150 A2- on the brake cylinder, plungers and sealing ring. Refer to the ⇒ Chemicals Manual .

1 - Brake caliper case

2 - Protective cap

- couple to the bleeder valve

3 - Bleeder valve

- 10 Nm
- before installing, apply a thin coat of Assembly paste - G 052 150 A2- to the thread. Refer to the ⇒ Chemicals Manual .

4 - Spacer sleeve, upper

- assemble with Assembly paste - G 052 150 A2- . Refer to the ⇒ Chemicals Manual .

5 - Sleeve, upper

- cut
- assemble with Assembly paste - G 052 150 A2- . Refer to the ⇒ Chemicals Manual .

6 - Bushing, upper

- couple to the brake caliper

7 - Bushing, lower

- couple to the brake caliper

8 - Sleeve, lower

- cut
- assemble with Assembly paste - G 052 150 A2- . Refer to the ⇒ Chemicals Manual .

9 - Spacer sleeve, lower

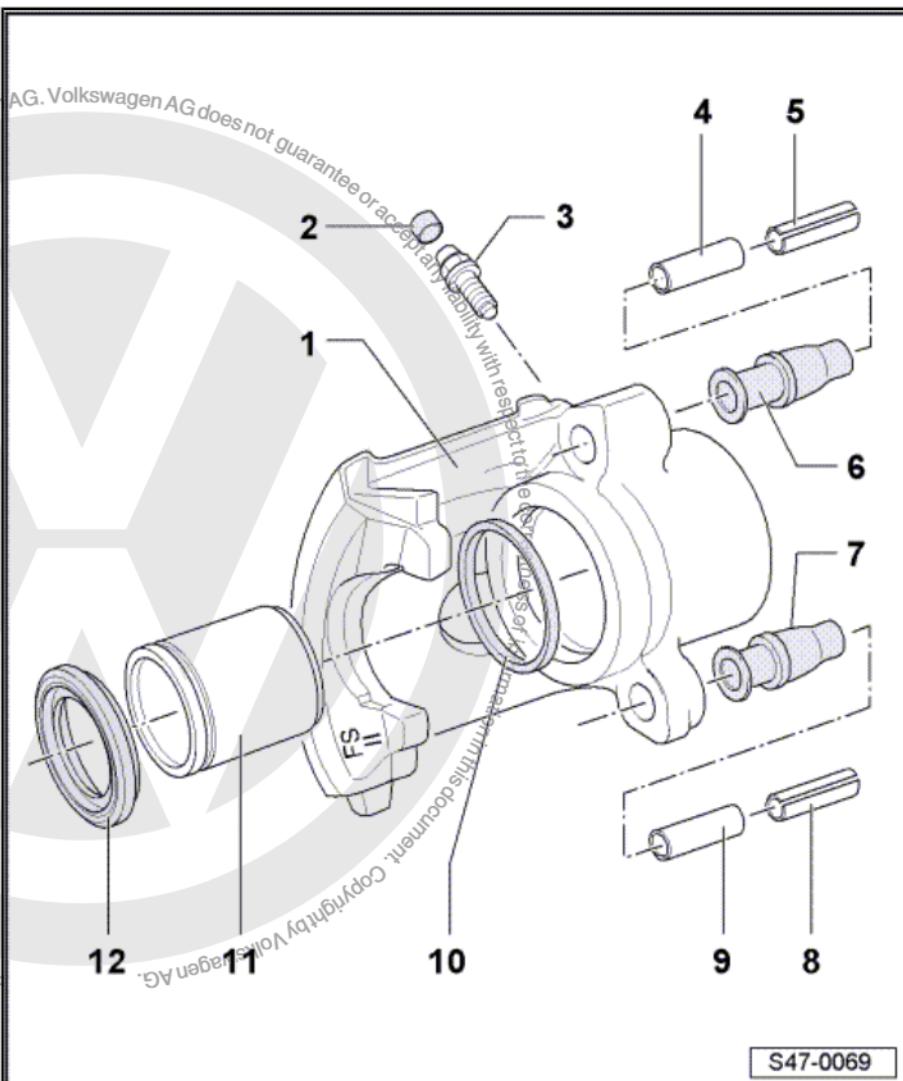
- assemble with Assembly paste - G 052 150 A2- . Refer to the ⇒ Chemicals Manual .

10 - Sealing ring

- remove with the help of a plastic wedge [⇒ page 105](#)

11 - Piston

- remove and install [⇒ page 105](#)
- first apply a light coat of Assembly paste - G 052 150 A2- to the plunger. Refer to the ⇒ Chemicals Manual .



S47-0069



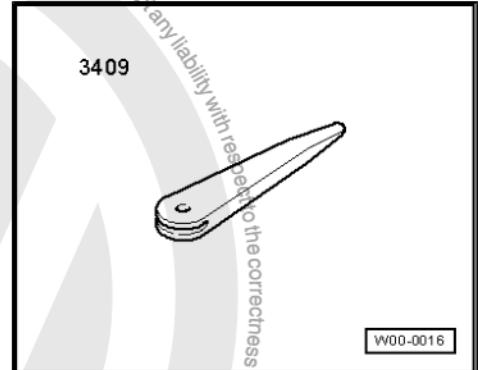
12 - Protective cap

- do not damage when inserting the plunger

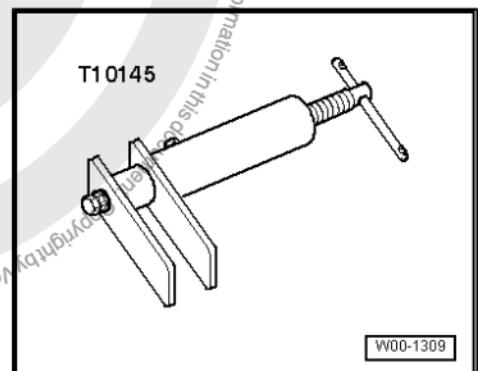
3.1 Plunger for front brake caliper - remove and install

Special tools and workshop equipment required

- ◆ Wedge - 3409-



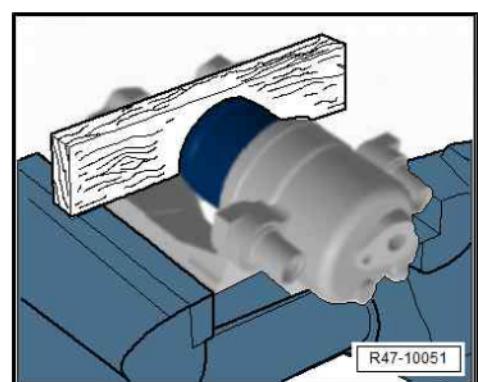
- ◆ Piston resetting tool - T 10145-



3.1.1 Removal

- Remove the plungers from brake caliper case with compressed air.

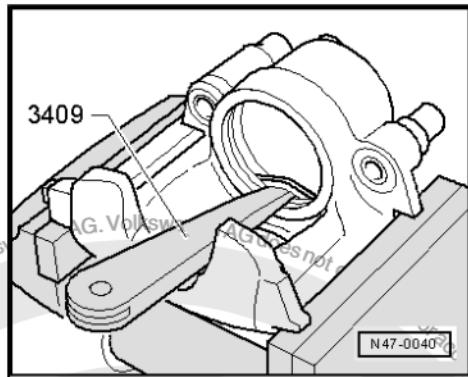
Place a wooden plate in the area so that the plunger is not damaged.





- Remove the sealing ring with the Wedge - 3409- .

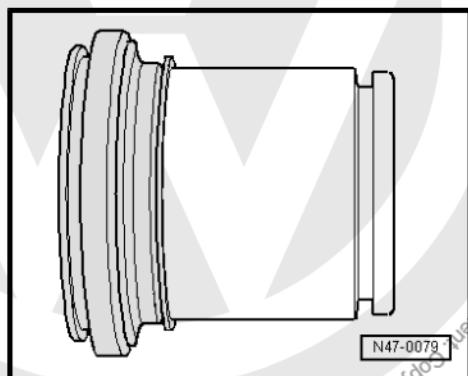
While removing, make sure that the cylinder surface is not damaged.



3.1.2 Installation

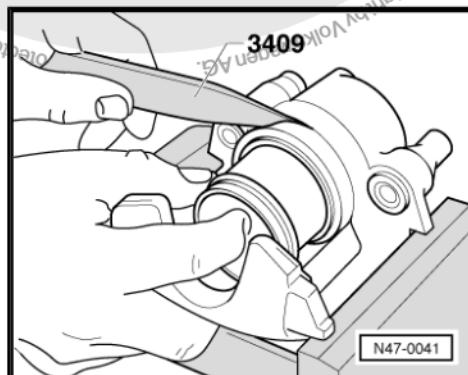
The plunger and sealing ring surfaces can only be cleaned with alcohol.

- Apply a light coat of Assembly paste - G 052 150 A2- to the plunger and sealing ring. Refer to the => Chemicals Manual .
- Install the sealing ring in the brake caliper case.
- Place the protection cover with the external sealing lip over the piston.



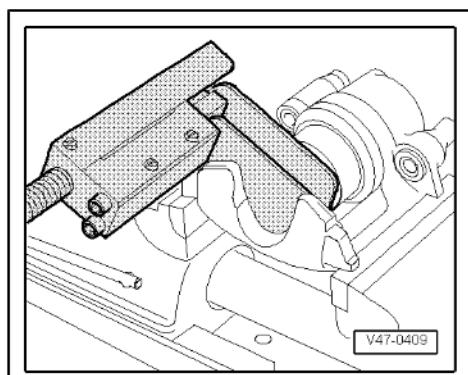
- Install the internal lip in the cylinder groove using the Wedge - 3409- .

Keep the plunger in front of the brake caliper case.



- Press the plunger with the repositioning device into the brake caliper case.

The external protection cover lip fits into the plunger groove.





4 Front brake caliper, FS II brake caliper - repair

- ◆ In case of repairs, install the full repair set.
- ◆ New brake calipers are filled with brake fluid and previously bled.
- ◆ Apply a light coat of Assembly paste - G 052 150 A2- on the brake cylinder, plungers and sealing ring. Refer to the ⇒ Chemicals Manual .

1 - Dust protection cover

- couple to the bleeder valve

2 - Bleeder valve

- 10 Nm
- before installing, apply a thin coat of Assembly paste - G 052 150 A2-. Refer to the ⇒ Chemicals Manual .

3 - Support sleeve

- couple to the brake caliper

4 - Guide pin

- 30 Nm
- Replace whenever removed

5 - Cover cap

- assemble in support sleeve

6 - Brake caliper

7 - Sealing ring

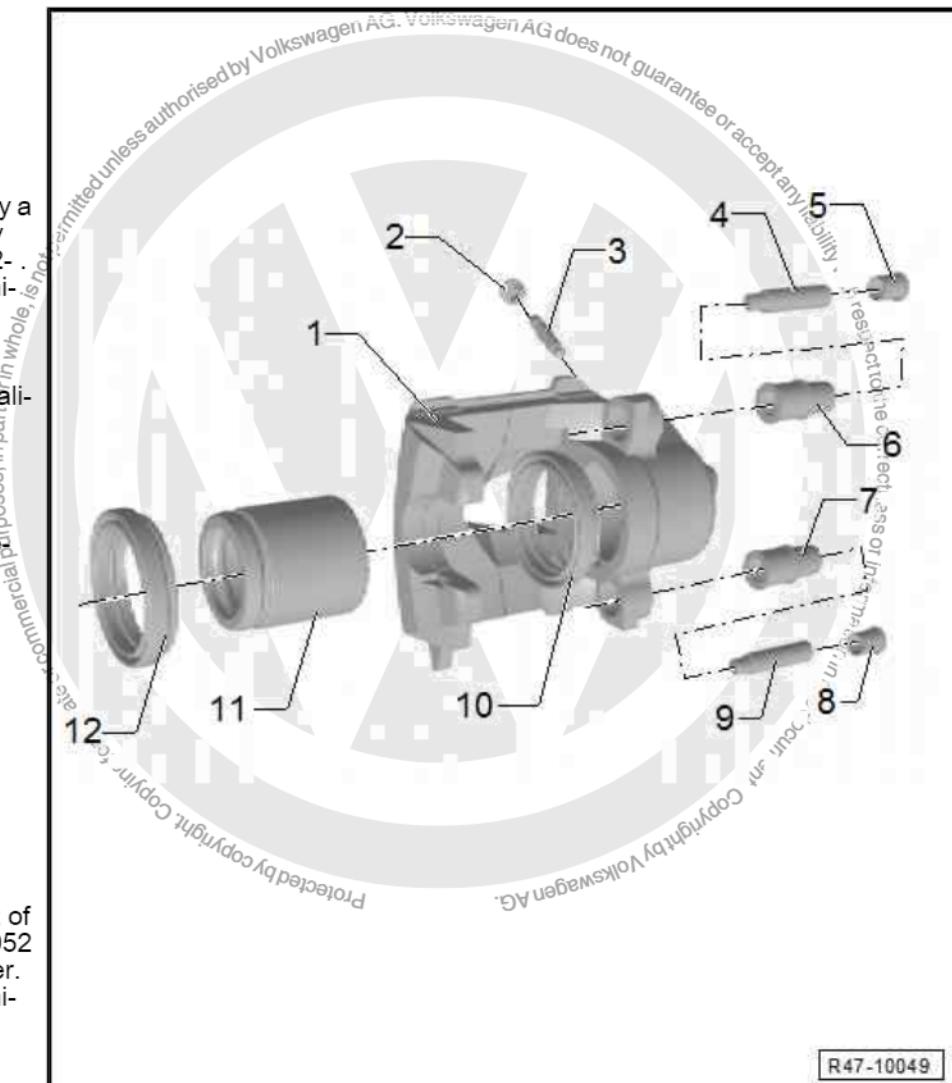
- remove and install
⇒ [page 107](#)

8 - Piston

- first apply a light coat of Assembly paste - G 052 150 A2- to the plunger. Refer to the ⇒ Chemicals Manual .
- remove and install
⇒ [page 107](#)

9 - Sealing ring

- remove and install
⇒ [page 107](#)



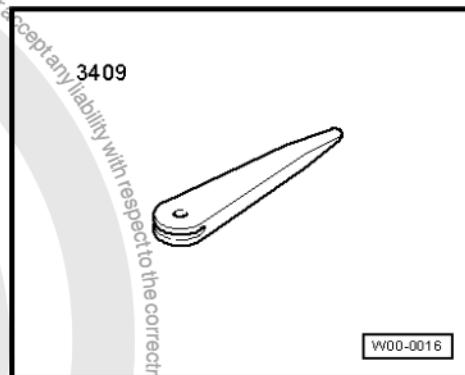
R47-10049

4.1 Front brake caliper plunger - remove and install

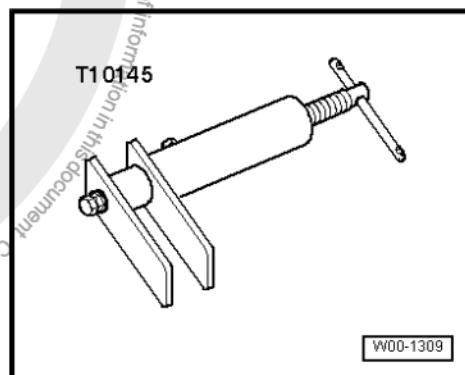
Special tools and workshop equipment required



◆ Wedge - 3409



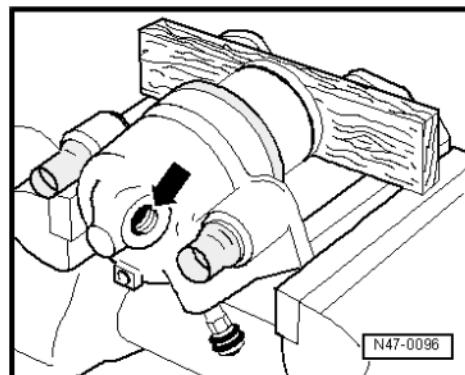
◆ Piston resetting tool - T 10145-



4.1.1 Removal

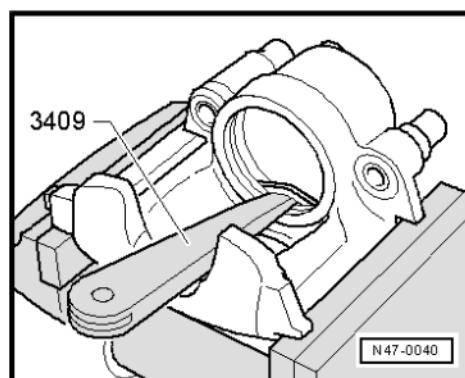
- Remove the plungers from the brake caliper case with compressed air.

Place a wooden plate in the area so that the plunger is not damaged.



- Remove the sealing ring with the Wedge - 3409- .

While removing, make sure that the cylinder surface is not damaged.

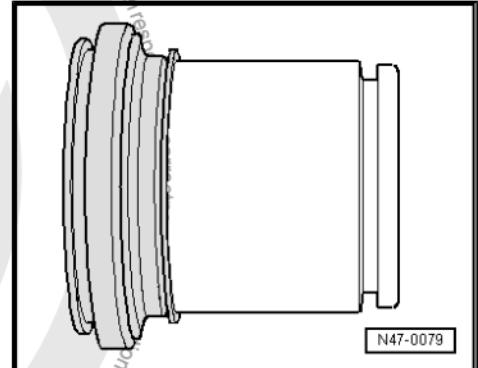




4.1.2 Installation

The plunger and sealing ring surfaces can only be cleaned with alcohol.

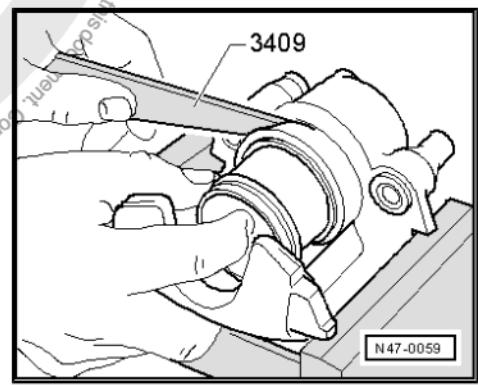
- Apply a light coat of Assembly paste - G 052 150 A2- to the plunger and sealing ring. Refer to the ⇒ Chemicals Manual .
- Install the sealing ring in the brake caliper case.
- Install the protection cover with the external lip over the plunger.



N47-0079

- Install the internal lip in the cylinder groove using the Wedge - 3409- .

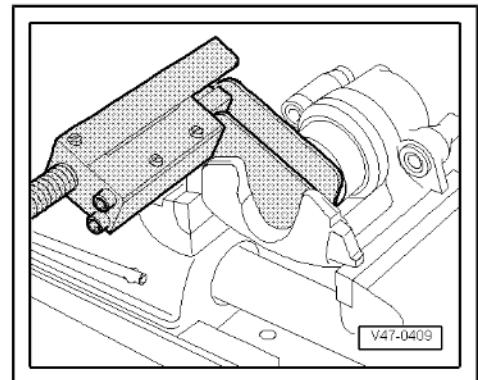
Keep the plunger in front of the brake caliper case.



N 47-0059

- Press the plunger with the repositioning device into the brake caliper case.

The external protection cover lip fits into the plunger groove.



V47-0409



5 Vehicles without braking power adjustment - assembly overview



WARNING

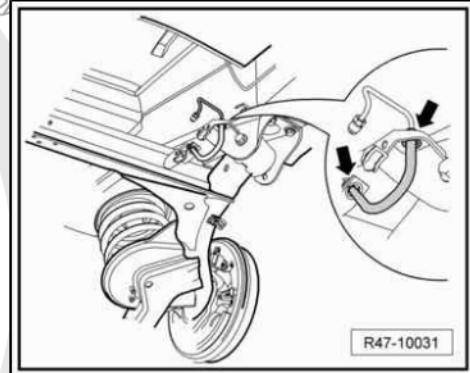
Always replace self-locking nuts and bolts subject to angular torque.

- Points for removing the flexible rear break line-arrows:- torque of 14 Nm.



WARNING

Whenever removed, bleed the break system [⇒ page 114](#).



R47-10031



6 Braking power adjustment - assembly overview

Braking power adjustment on vehicles without ABS.



WARNING

Always replace self-locking nuts and bolts subject to angular torque.



Caution

When performing any repair on the brake pressure adjustment valve, never apply grease or lubricants on the valve's spring, nor in any other brake system component.

1 - Braking force adjustment

- Adjust [page 112](#).
- Check [page 112](#).

2 - Mounting bracket

3 - Self-locking hex head bolt

- Replace whenever removed
- 17 Nm.

4 - Brake pipe connection

- Right rear wheel brake cylinder.
- Tightening torque for the brake pipes 14 Nm.

5 - Brake pipe connection

- Left rear wheel brake cylinder.
- Tightening torque for the brake pipes 14 Nm.

6 - Brake pipe connection

- Brake master cylinder/ floating plunger circuit for the hydraulic unit.
- Tightening torque for the brake pipes 14 Nm.

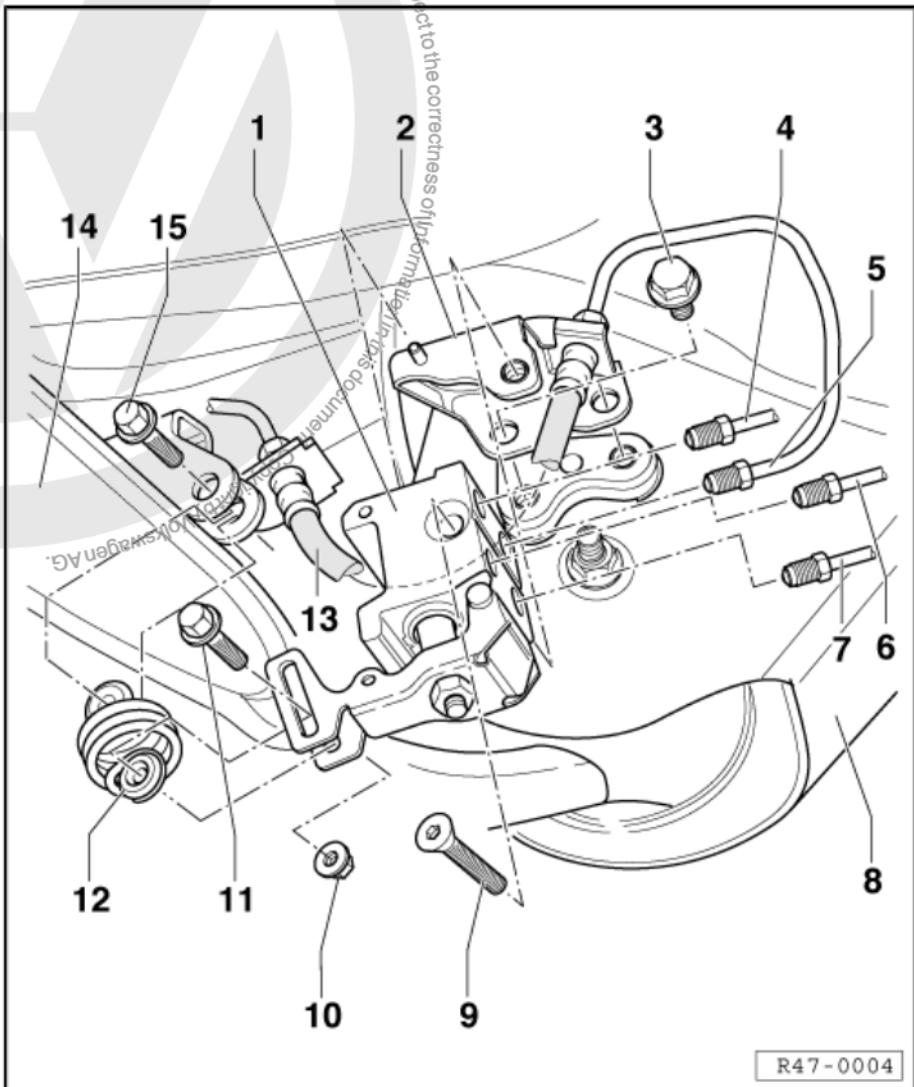
7 - Brake pipe connection

- Brake master cylinder/ push rod circuit for the hydraulic unit
- Tightening torque for the brake pipes 14 Nm.

8 - Retaining support

9 - Internal hex head bolt

- 20 Nm.



R47-0004



- 10 - Nut
- 11 - Hexagonal head bolt
 - 20 Nm.
- 12 - Extension spring
- 13 - Brake hose
- 14 - Axle beam
- 15 - Hexagonal head bolt
 - 16 Nm.

6.1 Braking power adjustment - adjust

Excessively high testing pressure on the rear axle:

- Relieve the adjustment spring.

Excessively low testing pressure on the rear axle:

- Tension the adjustment spring.



Note

Never relieve or tension the valve spring with the brake pedal pressed

Follow the sequence:

- Check the amounts [⇒ page 112](#)
- Adjust the spring.
- Check the amounts again [⇒ page 112](#)
- If necessary, re-make the adjustment.

6.2 Braking power adjustment - check

Special tools and workshop equipment required

- ◆ Control equipment for brake systems - V.A.G 1310 A-

Follow the conditions:

- The fuel tank must be full
- Driver weighing approximately 75 Kg
- The spare wheel and tools are in their respective assembly positions in the vehicle
- The water reservoir for the windscreen/headlight washer system must be full
- Lift the vehicle on a board-type elevator or use an inspection pit.

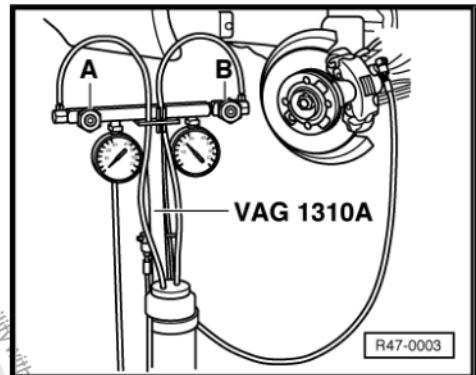


- Remove the cylinder bleeding bolts and install the adapters for the Control equipment for brake systems - VAG 1310A- diagonally, the front left wheel cylinder with the right rear wheel cylinder, or the right front wheel cylinder with the left rear wheel cylinder.
- Bleed the equipment through the regulator valves.



WARNING

Do not allow fluid shortage in the reservoir



Press the brake pedal until the front wheel pressure gauge indicates 70 bar and compare to the values to be obtained on the left wheel according to table [⇒ page 113](#).

- Repeat the reading and checking with 100 bar and check the table [⇒ page 113](#).

6.2.1 Braking power adjustment specifications depending on the load

Version	Axle	Pressure (Bar)	
Drum brake in the rear axle	Front	70	100
	Rear	35.7 ... 41.7	48.6 ... 54.6

- If the values found do not correspond to the ones indicated and the system has no leaks or other irregularities, readjust the valve or replace it.



WARNING

Never reuse drained fluid.

Use factory recommended brake fluid only.

- Remove the pressure gauges and bleed the brake system [⇒ page 114](#).



7 Bleed the brake system



WARNING

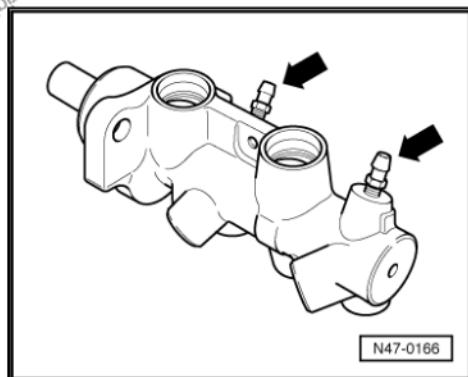
- ◆ Use only new brake fluid, in accordance with standard US FMVSS 116 DOT 4.
- ◆ The original VW/Audi brake fluid corresponds to this specification.
- ◆ The brake fluid is toxic. Due to its acidic properties it should not come into contact with painted surfaces.
- ◆ The brake fluid is hygroscopic, which means it absorbs humidity from the atmosphere and, therefore, must always be stored in hermetically sealed containers.
- ◆ Any brake fluid losses must be rinsed with water.

Particularities in the vehicles with ABS/EDS/ASR

- ◆ When a brake fluid compensation reservoir chamber is completely empty (e.g. brake system leaks), the brake system must be bled.

Particularities on vehicles with steering wheel on the right side:

- ◆ When a brake fluid compensation reservoir chamber is completely empty (e.g.: brake system leaks), or an ABS hydraulic unit - N55- is replaced, after the basic adjustment the brake cylinder must be bled by the plugs -arrows-.



7.1 Bleed the brake system with the filling and bleeding equipment

Special tools and workshop equipment required

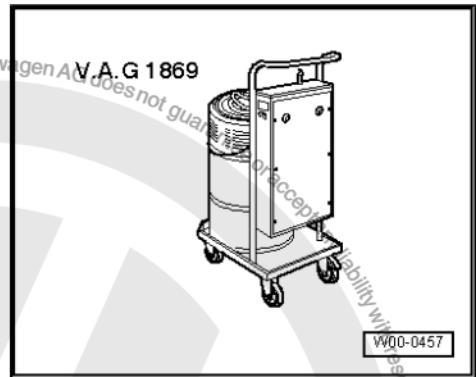
- ◆ Brake filling and bleeding equipment - VAS 5234-



or



◆ Brake filling and bleeding equipment - V.A.G 1869-



◆ Bleeder accessory set - V.A.G 1869/4-



*On vehicles equipped with ABS/EDS/ASR brake systems, the system must be bled when the brake fluid reservoir is empty
[⇒ page 116](#)*

- Connect the Brake filling and bleeding equipment - VAS 5234- or Brake filling and bleeding equipment - V.A.G 1869- .
- Open the plugs in the sequence determined and bleed the brake cylinder/caliper.

Bosch 5.7 and 8.0 bleeding sequence

- 1 - Right rear brake cylinder/caliper
 - 2 - Left rear brake cylinder/caliper
 - 3 - Right front brake caliper
 - 4 - Left front brake caliper
- Keep the plugs open with the hose connected until fluid comes out free of air bubbles.

A test drive must be carried out after the bleeding. At least one ABS-controlled braking must occur in this test.

7.1.1 Later bleeding

After the test, the brake system must be bled with the filling and bleeding device connected. For this, a second operator is necessary:

- Strongly press and hold the brake pedal with your foot.
- Open the plug on the right side of the rear brake caliper.
- Press deeply the brake pedal to the stop.
- Close the plug while still holding the brake pedal.
- Slowly release the brake pedal.

This bleeding procedure must be carried out 5 times per brake caliper.

- Remove the plugs in the sequence determined and ventilate the brake cylinder/caliper.

Bleeding sequence

- 1 - Right rear brake cylinder/caliper



2 - Left rear brake cylinder/caliper

3 - Right front brake caliper

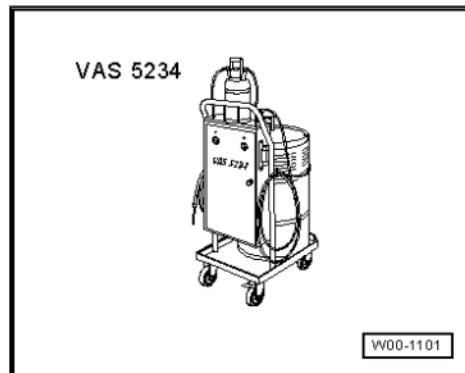
4 - Left front brake caliper

A test drive must be carried out after the bleeding. This drive must include at least one ABS-controlled braking!

7.2 Brake system, only vehicles with ABS/EDS/ASR - bleed when the reservoir is empty

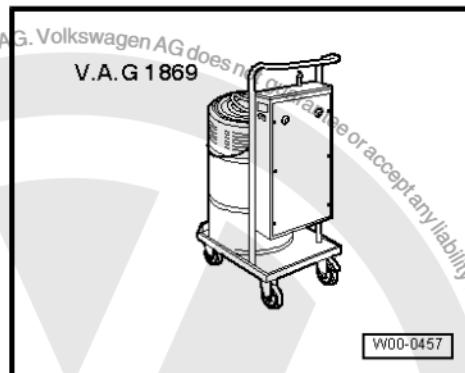
Special tools and workshop equipment required

- ◆ Brake filling and bleeding equipment - VAS 5234-



or

- ◆ Brake filling and bleeding equipment - V.A.G 1869-



- ◆ Bleeder accessory set - V.A.G 1869/4-

- Connect the Brake filling and bleeding equipment - VAS 5234- or Brake filling and bleeding equipment - V.A.G 1869- .
- Open the plugs in the sequence determined and bleed the brake cylinder/caliper.

1 - Simultaneously bleed the left front and right front rear brake caliper

2 - Simultaneously bleed the left rear and right rear brake caliper/cylinder

- Keep the plugs open with the hose connected to the bleeding container until the fluid exits free from air bubbles.

Then, the hydraulic unit must be bled once again, by means of the Vehicle diagnostic, testing and information system - VAS 5051A /52- [⇒ page 10](#) in the function "Basic adjustment".

- Then, bleed the brake system [⇒ page 114](#)



A test drive must be carried out after the bleeding. At least one ABS-controlled braking must occur in this test.



Note

Change the brake fluid every 2 years

